FOOD MANUFACTURE

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FOOD MANUFACTURE

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homogeneity *my foot!*

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FOOD MANUFACTURE

Vol. XXVII, No. 6 June 1, 1952

Twenty-fifth Birthday

IT IS manifest by the production of this special number that we are embued with a modicum of satisfaction on the occasion of our 25th birthday—a satisfaction enhanced by the kind messages received from so many of our friends.

The incidence of birthdays engenders thoughts of the past and speculations as to the future, taking the place of our present preoccupations. Those who seek wisdom from the pronouncements of the great must be confused by the divergence of the views expressed by the poets and philosophers, ranging as they do from sentimental regrets to such constructive and concrete utterances as those made in 1775 by Patrick Henry in his speech to the Virginia Convention: "I know of no way of judging the future but by the past." Contrariwise, Burke declared that "you can never plan the future from the past." Thus doubt is bred in the mind of the anxious enquirer as to the entire truth of the dictum in the Book of Proverbs "In the multitude of counsellors lies safety." Recent history seems completely to confirm these doubts!

The nature of our dietetic life of today must evoke the apotheosis of the "good old days" when luscious chops and steaks were the order of the day. If the opinions of sundry members of the medical profession are to be accepted, the general health of the community has not suffered from the diminution of the intake of proteins and fats. The health and physique of the children have improved, mainly owing to the provision of school meals and milk. The general trend towards the prolonged "expectation of life" has in fact presented a new problem which has focused attention on the science of gerontology, concerned both with the care and employment of the ever-increasing proportion of those in the higher age groups—an example of the disturbance of the balance when one solved problem is replaced by a new one.

It is a favourite pastime of lay writers and some scientists to belittle the food industry, but our intimate association with it for many years has resulted in the conviction that, as a body, they are giving of their best in confronting the many problems that face them.

As to the workers, we refuse to join the chorus of jeremiads about the shortcomings of those of the present day. There is too much of this talk, and it is bad psychology. Never was there a truer saying than "give a dog a bad name. . . ."

The fundamental nature of man does not change. Clockwatchers and spivs there have been and always will be, but in every normal man is an innate pride in achievement, be it great or small, and an urge to do a good job.

There is also talk about the mollycoddling of the workers. If the elimination of the appalling conditions existing in the last century, the adoption of incentives, and, most important of all, the application of psychology by those concerned with their direction can be described as mollycoddling, then the most progressive and successful industrialists are guilty of it. The final test of any system is whether it works. Not entirely in the matter of money making, but in the happiness of the myriad workers contributing to that system.

What of the future? There is a peculiar fascination attached to its consideration. It was widely indulged in by our ancestors by such means as the inspection of entrails and other picturesque ceremonies. The prophets, soothsayers, and medicine men have been replaced by scientists whose enthusiasm has prompted painstaking studies of future prospects.

A notable compilation of these is contained in the book *Four Thousand Million Mouths*, from parts of which the reader might gather that "Malthus was right." A more ambitious forecast is contained in another work by Sir Charles Darwin—*The Next Million Years*—a tough job of prediction.

The present world population of 2,000,000,000 is doubling itself twice a century, and eventually it will be sheer starvation which will keep the population down. His remedy for the salvation of *homo sapiens* lies in the application of the principles of Malthus brought up to date. Food will be the main contribution towards the minimisation of the starving margin of the future. It will be the task of the members of the food industry of that time to play their part to that end.

We thank our many friends at home and overseas for their heartening messages of appreciation and encouragement and assure them of our efforts in our particular sphere towards the continued prosperity of the food industry.

Improved Tinplate Outlook

IT IS heartening news for canners that instead of the anticipated 10 to 20 per cent. cut in the supply of cans, the overall position in 1952 is likely to be slightly better than in 1951.

Discussing the canning position in general, Lt.-Col. Maurice W. Batchelor, J.P., chairman of the Fruit and Vegetable Canners Association, said recently that this could, to some extent, be attributed to the new tinplate mills at Trostre in South Wales.

It had, he said, been extremely disappointing to find that many British canners had been unable to keep their factories fully occupied because tinplate had been sent abroad only to be re-imported into this country through products which could easily have been packed by British canners.

Other difficulties had been caused by the lack of high quality steel base, the priority requirements of the Forces, and the emergency stock-piling plan.

Excess Profits Levy

MANY industrial leaders have criticised the discriminating nature of the Excess Profits Levy announced in the recent Budget.

It is indeed a very severe disincentive, and places a heavy penalty on those firms who have engaged in research or in industrial developments in those years which form the "standard." A very strong case was made by Sir George Nelson of the English Electric Company, and by the Directors of the Decca Record Company, both of whom severely limited their profits in the standard years to develop processes and products.

Our own company has been adversely affected in the same way. The three standard years are just those in which this company made its great effort for wider circulation in the technical fields. It is probably not widely known that very large dollar appropriations from the Marshall Aid fund were used by selected American publishers to develop their overseas circulations. These were very largely in the technical fields and, looked at through American eyes, it was a very appropriate use of these funds, as obviously the wider dissemination of American technical journals was meant to lead to greater sales for American industrial plant and technical products, raw materials, and the machinery of production.

The publications of the Leonard Hill Technical Group have always led, and aim to continue to lead, in world circulations. In all the fields covered they have, we believe we can say, wider circulations outside their home country than their foreign colleagues in the same fields. In an attempt to preserve this position, a deliberate and complete curtailment of profits, and the ploughing back to the absolute maximum, was our policy. In the year 1950 approximately one million copies of the company's journals were despatched, far and away the greater majority of these being sent overseas. This is a not inconsiderable figure, when it is recognised that some of the journals, as for instance *Atomics*, must have a limited field. This intensive drive produced a slight loss in one year, and in the two subsequent years profits did not reach even 1 per cent. of turnover.

The cases of the two companies quoted above, and our own, are obviously not the only ones. Reason and logic demand a revision of the incidence of this impost.

Toxicology and Food Chemicals

WHAT is a poison? This simple question can be made unanswerable by the skilled debater. Sugar can kill the diabetic, but strychnine or morphia in prescribed amounts may be helpful. Today when the use of so many chemical additives in food production and processing is being questioned, it should be realised that toxicity is a relative term and that present methods of investigating toxicity hazards are far from precise.

Cardinal Richelieu always threw a scrap of food to his cats before meals. Our use of laboratory animals may be more scientifically developed but it is based on the same principle. It is at best one which contains crude assumptions and it is surely naïve to expect it to settle problems of toxicity that may at their worst be only marginal. Richelieu could possibly have been poisoned by beryllium if he had relied on his cat, animal tests having indicated that it was non-toxic before serious cases of human poisoning occurred in the beryllium-handling industry. Agene is a similar but inverse case; it has been found to affect dogs adversely but direct evidence of harmful effects upon humans has yet to be produced.

In a lecture to the American Association of Economic Entomologists, Dr. Frank Princi recently pointed out that much more reliable evidence existed about the residual toxic hazards of modern insecticides and fungicides than could be obtained from animal experiments. The people engaged in the manufacture of these substances, or in regularly applying them, are directly exposed to any risks that may exist. Despite the precautions taken in factory or field to protect these workers, it is probable that the amount of the substances absorbed by them is much greater than that which remains as a residue on or in foodstuffs.

Frequent attacks are made upon DDT, particularly as a cumulative poison, but the large tonnage used in the past ten years has been handled in concentration by many workers. In America 14 deaths have been attributed to DDT; of these 12 have been due to accidental or deliberate ingestion. Under 400 cases of ill-health through DDT absorption have been

reported; the symptom of sudden loss of weight regularly found in animal tests seems much less common with humans, and full recovery of health, even when an acute attack has resulted from excessive exposure, has usually been prompt with no recurrences. This does not mean that DDT should be assumed to be perfectly safe; it does suggest, however, that we should consider the available medical evidence and not rely exclusively upon animal tests.

Health Congress at Margate

NEARLY 2,500 delegates, consisting of health experts from 40 overseas Governments, and 1,000 local authorities in Great Britain, together with members of the World Health Organisation, assembled at Margate for the annual conference of The Royal Sanitary Institute. Sectional meetings and conferences covered the subject of hygiene from a large number of aspects among which was the section dealing with bacteriological standards for perishable foods, held in conjunction with the Food Group, Society of Chemical Industry, to which four important papers were contributed.

That these papers aroused considerable interest among a number of people having diverse interests was evidenced by the animated discussion which followed their delivery.

In his presidential address, Prof. H. D. Kay, C.B.E., D.Sc., F.R.S., Chairman of the Food Group, Society of Chemical Industry, and Director, National Institute for Research in Dairying, posed one or two questions which he said might serve as an introduction to the more meaty contributions which were to follow. He defined foodstuffs as substances capable of being used by the digestive and metabolic system of the animal body for growth, energy production, or maintenance, these usually being complex carbon compounds of an unstable nature. The extent to which a food was capable of being attacked by micro-organisms was in general the measure of its perishability. It was true that occasional spoilage of food might take place owing to purely chemical effects in the absence of living cells, *e.g.* the atmospheric oxidation of fats, but in the majority of so-called perishable foods, it was the presence of micro-organisms which brought about spoilage.

What type of bacteriological or micro-biological standards, asked Prof. Kay, could or should be set up for different foods to reduce to a manageable minimum the risk of this type of spoilage?

Certain other types of micro-organism, fortunately rather uncommonly encountered, might produce substances not necessarily of evil flavour, but might be toxic (such as certain staphylococcal products) or even deadly (such as botulinus toxin) to the animal consuming the infected food. Again Prof. Kay asked whether it were possible to devise bacteriological standards to assist in the control of this somewhat infrequent type of spoilage.

Finally, there were the truly pathogenic organisms which might occur in food, usually not contributing to its perishability but which, under certain circumstances, might cause disease. Typical examples were the tubercle organism and the various bacteria of the typhoid group, which were more likely to be found in the perishable than in the more stable foods. Could bacteriological standards assist in this public health risk—a risk which was fortunately diminished by ordinary decency in food preparation?

It was evident, said Prof. Kay, that different types of standard and a different approach were necessary for dealing with each of the three types of potential bacterial spoilage of perishable foods. He proceeded to discuss the nature of the work entailed in bacteriological examinations and the implications of their results. If standards were to be laid down, it seemed clear that extensive preliminary consultation between trade laboratories, research organisations, professional bodies, and the Government departments concerned would be required.

In general, the principle of experimental trial of some types at least of proposed legislation over a small but statistically sufficient portion of the country before the final form of the legislation were laid down was one that might in the future receive more attention than it had in the past.

Decay in Stone Fruits

BROWN rot losses of peaches in transit caused by *Monilinia fructicola* (Wint.) Honey have become a limiting factor in the marketing of this crop and preliminary investigations have been undertaken by J. S. Vandemark and E. G. Sharvelle of Purdue University, Lafayette, Indiana (*Science*, **115**, 2980, 1952) to ascertain whether the use of volatile chemicals would reduce the losses which frequently exceed 10 per cent. of the crop value.

Peaches and plums were inoculated artificially with a mixed spore suspension of *M. fructicola* and *Rhizopus* spp., and then incubated at 80°F. and above 90 per cent. relative humidity for a 24 hour period prior to treatment with volatile chemicals.

Replicated fruit samples were then placed in closed glass cylinders of 40 l. capacity, inside which the chemicals under test were introduced in open glass containers, permitting complete volatilisation within the closed treatment chamber.

After a 24 hour treatment period, the fruits were removed from the chemical atmosphere and stored at laboratory temperature at a relatively high humidity for an additional period of 72 hours.

Trichloroethylene prevented all breakdown of the inoculated fruit and was effective at a concentration as low as 1 : 10,000 (1 vol. non-volatilised chemical

in 10,000 vol. atmos.). No injury resulted to peaches and plums when exposed for 24 hours to concentrations of 1 : 4,000 and 1 : 10,000 of the chemical. The untreated control showed complete breakdown within this five-day period.

Tetrachloroethylene and 1,1,2-trichloroethane also inhibited rot completely but caused some browning of the fruit at a concentration of 1 : 4,000 and less at 1 : 10,000. Observations suggest that much of this browning could be eliminated by circulating the atmosphere during the period of treatment, as the vapours apparently tend to stratify and settle to the bottom of the treatment containers.

S-tetrachloroethane inhibited all rot development completely at concentrations of 1 : 4,000 and 1 : 10,000 but also caused browning of the fruit. There is a possibility that lower concentrations of this chemical might be effective, since laboratory tests *in vitro* indicated that it would inhibit pure cultures of *Rhizopus* spp. and *M. fructicola* at concentrations as low as 1 : 20,000.

These findings have been substantiated by pure culture toxicity tests in the laboratory with fungi as well as bacteria and are preliminary to more extensive studies now in progress on the evaluation of volatile chemicals as preventatives for market, storage, and in-transit losses to fruits and vegetables caused by micro-organisms.

U.S. View of Price Controls

In an address to members of the Board of the American Meat Institute, Robert J. Kleberg, Jr., attributed the threat to America's beef supply to Government regulations and artificial price controls.

Citing the experience of other countries, particularly Argentina, as examples of how Government controls had been gradually shrinking the world's supply of beef, Kleberg said that if the Americans were to learn from these lessons, price controls on beef should be forgotten for good.

As a result of controls Argentine production had dropped from 100,000 tons pre-war average to 50,000 tons. Argentines used to eat 240 pounds of meat a year, but recently the Government had imposed two meatless days a week. Controls had also brought about severe curtailment in production in Cuba where the Government had imposed regulations similar to those operating in America.

In the United States production had decreased from 409 head of cattle per thousand persons in 1918 to 371 head per thousand persons in 1950—a drop of over 24 per cent.

Expanding population and expanding economics had increased the pressure on agriculture and the livestock industry to supply food for a bigger population and a better eating world, but the Government had cramped and restricted producers to the point where meat production had gone up only nine per cent. during the past ten years while the population was increasing by 16 per cent. By 1960 there would be 20 million more people to feed in America and production was going down, not up. The imposition of all sorts of artificial controls disturbed future planning for the production of beef, and unless it were stopped history would repeat itself. Ceiling prices would become floor prices and the inevitable result would be the rapid growth of black markets.

Fads and Fancies

To some people many of the topics published in the daily papers may be dull, but no one can deny their liveliness when food or diet fads and fancies hit the headlines. There is the example of those rebellious Michigan convicts now granted all their demands including "a dinner fit for a king"—prime steak, followed by "ice cream with all the trimmings." In quieter vein there are such absorbing items of research as the Duke University discovery that the best antidote for unknown poisons consists of burnt toast providing absorbent charcoal, and strong over-brewed tea for tannin which neutralises alkaline bodies and precipitates others.

The Budapest hens laying eggs with a trace of iodine are to be rivalled by British hens laying radio eggs. Not eggs with radioactive tracers, as might be supposed, but eggs laid with the encouragement of the B.B.C. This is the idea of a Norfolk poultry farmer who claims to have banished the birds' boredom by wireless, the music from which increased production by ten per cent. Since writers to correspondence columns are ever complaining of the utter boredom of such-and-such a programme, may not the opposite effect be achieved? "The birds do not mind what the programme is," says this pioneer, but we should like some more definite lead, something on a par with the farmer who got milk quicker whenever gramophone records of hunting songs were played in the cowshed. It would be a mistake, surely, if there should be any revival of that one-time ditty asking: "Say, little hen: when, when, when will you lay me an egg for my tea?" One slip like that, and the gaff would be blown and the damage done.

Up in Glasgow they have discovered that the cure for the ten-day attack of hiccups suffered by Mr. George Paterson is good old allyl isothiocyanate, otherwise mustard, taken in cold water. This gentleman had 50 cures sent him by post, yet the successful one was Pliny's pungent potion which "burns like fire, yet is remarkably wholesome for the body." Mustard in love potions, in cures for coughs and for serpent-bites, is old news, but now Mr. Paterson has found a new proof of the virtues of "a grain of mustard seed."

Pea Canning by the Hydro System

T. M. Jones
Mitchell Engineering Ltd., Food Machinery Division.

In American and certain European canneries, the hydraulic conveying of peas between various mechanical units in the line, including their passage through a series of pipes for blanching, is an old-established method, replacing gooseneck elevators, rotary blanchers, and ancillary equipment. This system has the advantage of reducing maintenance costs and ensures better hygienic conditions. An analysis of this procedure suggests that far too much machinery is still included in the set-up of a pea canning line. The installation described in this article is operating in Britain as the result of the long-term investigations carried out by the author into the development of the Hydro system.

THE fundamental methods achieving the complete breakaway from orthodox ones in the preparation of process peas and beans for canning may be epitomised as the use of water to perform the effective work of conveying, cleaning, and processing. The peas, together with that part of the plant in contact with them, remain in water throughout the process; consequently not only do the peas emerge in the best condition, but also the plant is maintained in a hygienic state.

One of the results of the new system is that process peas, the backbone of the pea canning industry in Britain, can be produced with an appearance and taste similar to the fresh garden variety.

The general layout of a standard Jones-Mitchell line includes all the equipment necessary, from the loading of the raw product into the soaking tanks to the hopper above the can filler. The line occupies a floor space of 35 ft. 9½ in. by 10 ft. 10½ in. with headroom of 11 ft. 7½ in. to the top of the handrail, the capacity being 120 A 1 Talls per minute.

Peas are fed direct from the bags on to the grid of the filler tank, falling through a depth of used water which continually flows over a weir carrying away a large percentage of worm-eaten peas and other extraneous floating debris.

The peas are then ejected into any one of the soaking tanks, which are filled with water so that in falling through a column of water 5 or 6 ft. in depth a further wash is given and any floating debris is automatically discharged through the overflow into the waste basket fitted to the filler tank.

After soaking for the appropriate period they are then ejected on to the top flume in a continuous stream over the stone extrac-

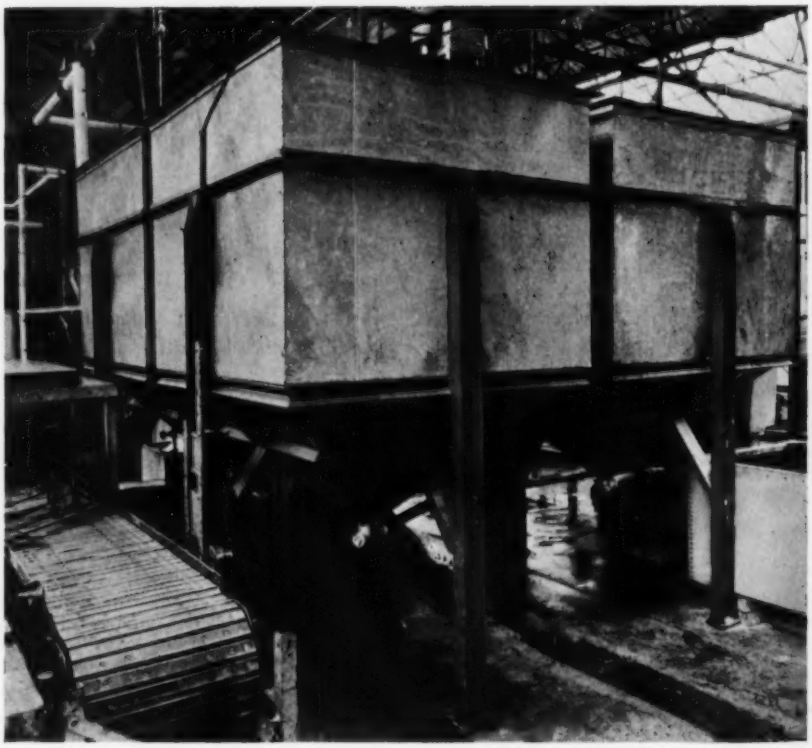
". . . The general layout of a standard Jones-Mitchell line includes all the equipment necessary, from the loading of the raw products into the soaking tanks to the hopper above the can filler . . ."

". . . Peas are fed direct from the bags on to the grid of the filler tank, falling through a depth of used water which continually flows over a weir . . ."

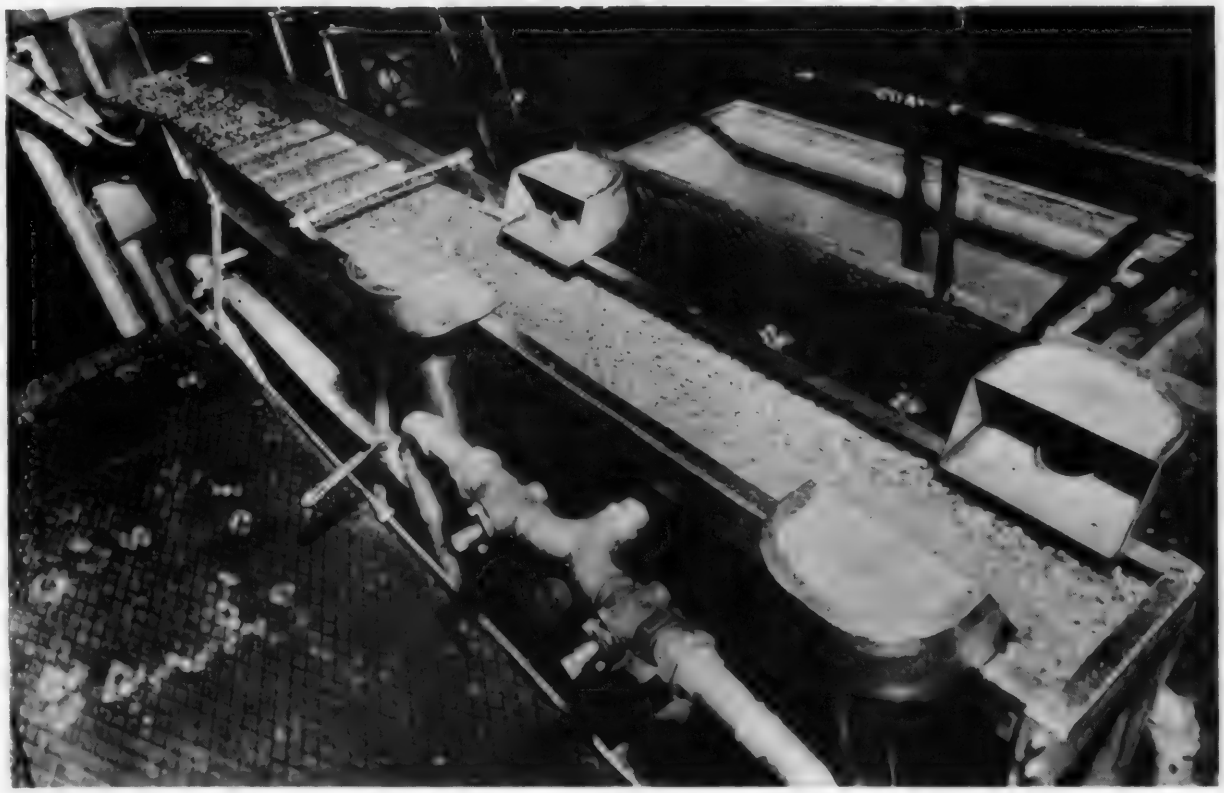
tor, after which they pass down the separator steps through which the splits, loose skins, and other extraneous matter are carried into the return flow pipe and back into the waste basket. The whole peas pass over the steps into the Hydro blancher where they are retained for a predetermined period before being ejected on to the top flume. After the initial batch of peas is retained in the blancher for the appropriate period, the incoming and outgoing flow is synchronised with the correct volume required for the output of the line.

Blanching Temperatures

The special feature of this type of blancher is that by virtue of the hydrostatic pressure the peas can be blanched at temperatures starting at 130°F., rising steadily to a final one of 223°F. and leaving at approximately 140°-160°F., after which they again pass over a set of separator steps on to the Hydro picking table. Splits and skins released in the blancher pass through



". . . The peas are then ejected into any one of the soaking tanks . . ."



". . . after soaking for the appropriate period the peas are ejected on to the top flume in a continuous stream over the stone extractor, after which they pass down the separator steps . . ."

". . . The whole peas pass over the steps into the Hydro blancher where they are retained for a predetermined period after which they are ejected on to the top flume . . . the incoming and outgoing flow is synchronised with the correct volume required for the output of the line . . ."

". . . The peas discharged from the blancher on to the entrance of the Hydro picking table are conveyed by a flow of clean fresh water to and over the final separator steps into the hopper over the filler. Splits, skins, etc., with the fresh water return to the waste basket . . ."

"... a suction device has been incorporated with effective results ..."

the steps with the warm water into the top of the blancher and out through the overflow.

Temperatures are automatically controlled; the level of peas in the blancher as well as the operating pressure is shown by gauges on the board adjacent to it, which is readily visible to the operator in control of the line.

The peas discharged from the blancher on to the entrance of the Hydro picking table are conveyed by a flow of clean fresh water to and over the final separator steps into the hopper over the filler. Splits, skins, etc., with the fresh water return to the waste basket, this water passing through to the circulating tank and supplying the line with the water.

The level of peas in the hopper over the filler is visible to the operator, so that any out-of-balance flow can be rectified by adjusting the pressure in the line by means of a valve fixed adjacent to the filler.

The Hydro picking table has the unique feature in that it is impossible for the peas to lie in anything but single layers, and as each pea revolves on its axis in its passage over the table, blemishes are readily detected.

The temperature of the water can be controlled so that the peas are warm when they enter the filler, and with hot brine the temperature at the time of closing the cans is high and ensures a high final vacuum in the cans.

Speeding up Picking Operation

The fact that stone, splits, and loose skins have been eliminated before the peas arrive at the Hydro picking table, leaving only discoloured peas to be removed, and that the peas can momentarily be stopped in their passage not only materially reduces labour at this stage but also enhances considerably the ease of picking. In this connexion, a suction device has been incorporated with effective results.

(*Continued on page 222*)

British Marrowfats and Lincolns, and small peas from Holland, Switzerland, and Norway have been tested, all with equally good results. In the usual packs of process peas, the liquor becomes cloudy after a short period, but it will be seen that after three months, the packs in the illustrations are still crystal clear. British Marrowfats on the left, Lincoln Blues on the right.

The U.S. Canning Industry from 1940 to 1950

Part II

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Agitating Vacuum Process

ONE of the earliest processing improvements which came into major prominence in the industry as a means of quality improvement was the "vacuum pack" process, which was introduced commercially in the late 1920's. This is a process in which foods of particulate type, such as whole kernel corn and peas, are packed with only a small quantity of free liquid in the can by sealing the can under high vacuum and then processing in the conventional manner.

Within the last five years, substantial progress has been made in profiting from the advantage which can be gained by employing with vacuum packed products the principle of can agitation during the process to accelerate the heat penetration and thus make possible a reduction in processing time. Roberts and Sognefest[19] published data from an extensive investigation, showing the magnitude of advantages that could be realised by applying the agitation principle as exemplified by cookers of various types. They stated, ". . . during 1946, several canners utilised the agitating process for vacuum packed corn."

The 1946 activity apparently was concerned primarily with batch cookers which provide agitation by means of a revolving crate. Starting in 1944, however, experiments had been under way by the Green Giant Company on a small scale can rotation open type of processing unit utilising a high boiling point liquid as the heating medium.

This unit, known as the Thermo-Roto machine, consists basically of a series of parallel rollers with centres so spaced as to accommodate cans of various sizes resting horizontally on the rollers in rows which are defined by the furrows between the rollers. The rows of cans are moved successively from

C. Olin Ball.

one furrow to the next by means of pusher arms, one of which is located between each two adjacent rows of cans.

The series, or bed, of rollers is called a deck and, as the rows of cans move across the deck in successive steps from one furrow to the next, the cans are sprayed by the liquid heating medium. Cooling of the cans in water sprays is carried out by a similar procedure on a second deck. The hot deck holds about 50 cases of 307-306 cans.

Packing of Corn

During 1946, samples of corn were packed for quality tests, and in 1947 the first commercial scale unit was operated on corn on an experimental basis. Peas were processed in an experimental unit in 1947 but no improvement in quality was produced, as compared with that of regular still-cooked vacuum packed peas.

A pronounced improvement in quality of corn was obtained by processing in this machine, and, starting in 1948, a plant scale machine was operated on vacuum packed corn.

One difficulty however arises from inadequate mechanical strength in standard cans to withstand the high pressure which is generated within the cans, counteracted externally only by normal atmospheric pressure. While this situation does introduce a problem, buckles in the can ends can be prevented by the use of abnormally heavy and high tempered plate, to which assistance may be given by the use of special end profiles.

Vacuum Packed Peas

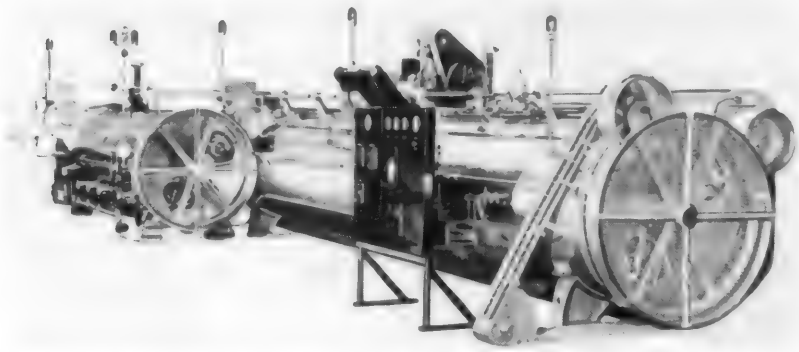
Extensive experiments with vacuum packed peas in 307-306 cans in 1949 gave results which still left much to be desired. It was difficult to produce a pack having desirable texture without using a quantity of brine which was practically equivalent to that of brine packed peas. Maximum rate of heat penetration was obtained with two ounces of brine per cent.

Continuous Cookers

For many years, brine packed whole kernel corn has been processed in a continuous cooker of the type in which the cans are conveyed in a spiral path on the periphery of a rotating reel. In 1950, for the first time in commercial operation, vacuum packed corn in 307-306 cans was processed in such a cooker by the Green Giant Company. The results are reported to have been quite satisfactory from all standpoints. Temperatures of not less than 260°F. (127°C.) were employed in the cooker. The operation was repeated in 1951.

Acceleration of Heat Transmission

Vacuum packed foods, such as corn, are slightly compressed within the can when it is sealed; therefore, in the early part of the process, the solid pieces of the food do not move about when the can is agitated. The acceleration of the heat transmission, there-



A continuous pressure cooker-cooler.
Photo Food Machinery and Chemical Corporation.

fore, is accomplished only through the movement of the brine through the interstices among the solid pieces consisting of kernels, in the case of corn.

It is apparent that, under this situation, a medium quantity of brine would give more rapid transmission of heat than either a very small quantity of brine or sufficient brine to fill all interstices of the product. The latter fact has been verified by heat transmission studies in corn and peas, which showed the optimum amount of brine to be approximately two ounces per 307-306 can.

Less than two ounces was not enough to carry heat to the centre of the can at the maximum possible rate; brine in greater amount than approximately two ounces is less active in moving about in the rotating can than is the optimum amount of two ounces. In addition, the heating of the can contents is retarded somewhat by the presence of a greater quantity of brine because of the heat required to raise the temperature of the excess brine.

Experience has shown that conventional 307-306 cans containing vacuum packed products sealed under vacuum of at least 20 inches will panel if subjected abruptly to the optimum processing pressure of a continuous cooker for these products. For this reason, it is customary to pass the cans through a preheater at moderate temperature and pressure before running them into the sterilising cooker.

A preheat treatment of two or three minutes at approximately 220°F. has been found sufficient to produce an internal pressure which will prevent panelling of the cans upon entering a cooker operating at 20 pounds pressure.

Sterilmatic Process for Corn

Owing to the importance of sweet corn in the American canned foods industry, cream style corn was one of the first products to be studied in the endeavour to sterilise canned foods in a continuous manner. The first tests were made in cookers in which the cans were rotated at a speed sufficient to produce movement of the product within the container.

The first commercial scale continuous cooker to be tried was that in which the cans are conveyed in a helical path on a rotating reel, in which the cans roll on the spiral track as they travel along the lower part of the periphery with each turn of the reel. The process was not successful because agitation of cream style corn during heat processing for sterilisation produces coagulation of the creamy portion of the product. Being a complex colloidal system, this creamy portion is very sensitive to agitation under heat.

Starting with tests on the Johnson cooker in Hoopeston, Illinois, in 1920, in which tests the author participated, attempts were made to produce a practical continuous cooker in which cream style corn could be sterilised without curdling. Experimental results with the Johnson cooker were unsatisfactory. Extensive experiments were conducted to study the effects of materials which might give physical stability, including various starches and gums.

A "non-agitating" type of the helical track, reel type cooker was built, in which the rotation of containers about their own axes was prevented. The conclusion reached was that any continuous cooker which gave sufficiently gentle treatment to the product to avoid curdling was too costly to use because of the capacity required in order to give a process of the necessary length.

The problem was never discarded in despair, and its solution has been sought at intervals over a period of about 30 years; finally, success was announced in 1950. Wilbur[20] announced the development by Frank Hickey and R. S. Whitmore of a process in which a special starch is used as a stabiliser to prevent coagulation when heat penetration into the product is accelerated by agitation during the process.

He states, "a corn starch has been produced which meets rigid bacteriological standards and which is effective in quantities smaller than those commonly used in current practice. This starch is such an effective anti-coagulant that by its use alone curdling of cream style corn can be suppressed."

An indication as to the nature of this starch may be contained in the following extracts from Wilbur's description of the nature of curdling. Referring to the curds from the cream style matrix of corn, the author stated, "in the yellow varieties of sweet corn, these curds are found to be largely protein associated with corn oil and pigment. . . . It has been shown that these curd proteins are derived from the milk and the fresh endosperm. . . . Endosperm milk when freshly expressed from the raw kernel contains elements of the coagulum, together with starch grains and other solubles and dispersions. . . . A typical Golden Cross Bantam variety, containing about 70 per cent. moisture, shows on the original wet basis about 1·4 per cent. total N, and about 0·14 soluble N.

"The total starch was about 7

per cent., and the 'free starch' about 4·5 per cent. The free starch referred to is starch floating freely in the fluid dispersion, and not associated with particles of material size. It appears that the soluble nitrogen and the free starch play a larger, if not completely understood, role in curdling and consistency problems than the total nitrogen and total starch. . . . There appears to be strong support for the view that the heat coagulation of the soluble protein fraction is the cause of curdling and that agitation causes agglutination, thus interfering with the formation of a smooth gel."

The consistency of the product during processing and the amount of headspace in the container are necessarily controlled rigorously to ensure successful operation of this process.

The short process of 16 minutes at 275°F. which is made possible by mechanically induced convection gives a product of markedly better colour and flavour than that obtained from the conventional method of processing.

Flexibility of Continuous Cookers

The usefulness of the continuous cooker of reel and spiral type has been materially expanded by the introduction, within the past two years, of improvements which make a single cooker capable of handling cans which vary substantially in both diameter and length. By only a valve change, a given cooker is made capable of running cans of 307 diameter, varying in length from 306 to 409, cans of 300 diameter, varying in length from 400 to 409, or cans of any size intermediate to those named. In fact, cans of both 307 and 303 diameters, in certain lengths, can now be handled without a valve change.

Another very recent improvement, consisting of a positive "paddle" discharge incorporated into the valve, combined with a turret transfer between the units of the line (preheater, cooker, and cooler), makes it possible to handle cans of large size at a very high rate. This is accomplished by allowing more time to effect the transfer, thus reducing the acceleration necessary on the can. Furthermore, this improvement prevents transfer impact on the can seams—another very important accomplishment.

End-over-end Rotation of Containers

During the past five years, intensive studies were made of the nature of the turbulence produced in a liquiform product in a container while in end-over-end rotation. Such rotation is effective in accelerating the rise of temperature of the entire contents of the containers to a greater degree than any other type of container movement. When the axis of rotation is located externally to the containers, however, the speed of rotation must be so controlled that it will not exceed that at which the composite force of the centrifugal and gravity effects, by producing stagnation in the product, begin to increase the time required to raise the temperature of the entire contents.

Clifcorn *et al.*,[21] in describing a study by one laboratory of the effects upon induced currents within the container of balancing the centrifugal and gravitational forces acting upon the product during rotation of the containers, state:

"It was found that by selecting the proper speed the headspace volume could be made to pass through the liquid at various levels, and when the speed is such that the centrifugal force equals the weight of the liquid contents, the headspace volume passes approximately through the centre of the can. This was also found experimentally to give maximum turbulence within the can contents, resulting in the greatest rate of heat penetration.

"This was considered important because it showed that for the maximum rate of heat penetration, the headspace volume must be made to pass through the approximate centre of the can."

The above conclusion was not confirmed by the author in a similar study. Viscosity was found to have a greater effect upon the speed of rotation which will give the highest rate of heat penetration than can be accounted for by difference in density of the product alone. Thus, it appears that the maximum rate of heating of liquiform products occurs when the speeds of rotation are such that the headspace passes through the product at various levels in the container, the location of which levels in each case depends upon the viscosity of product.

The author also found that the sterilising efficiency of a process in which the cans are revolved about an axis located externally to the cans does not appear to increase progressively with increase in speed of revolution until a peak is reached, then to start immediately to decrease; the sterilising efficiency appears to increase progressively with increase in speed of revolution until a maximum value is reached, and this maximum seems to persist with practically no change in value through a considerable range of further increase in speed of rotation before beginning to decrease due to the increase in magnitude of a static condition in the extremity of the container which is furthest from the axis of revolution as the speed of rotation continues to increase.

The above comments, including the conclusion of Clifcorn *et al.*, apply solely to the condition in which the container revolves about an axis which is external to the container. Clifcorn *et al.*[22] have United States patent rights on the process of this type in which the speed of revolution is such that "the centrifugal force and weight exerted by the contents will cause said gaseous space to move along a portion of the walls of the cans and then across the cans substantially at the centre thereof," which condition is said to occur when the centrifugal force on the product at the centre of gravity of the product lies within the range of from one-half to one and one-half times the weight of the product.

The commercial possibilities of the end-over-end rotation type of process have been explored only slightly.

Strata-Cook Process

Another method of speeding up the sterilisation of products consisting of a mixture of discrete

particles and a finely divided component in a liquid such as water or brine, which was developed and put into commercial use within the past few years, is the Strata-Cook process.

This process is applicable provided the product can be formulated by assembling the three components of the product in the container in a specified manner so that the components can be stratified within the container and the finely divided component kept separated from the mixture of discrete particles and brine during the heating of the container for sterilisation.

After heating has been accomplished, the finely divided component is mixed with the discrete particles and brine, either by shaking the sealed container or by stirring after the container is opened.

The discrete particles and brine occupy more than half of the volume of the container and, since heat is transmitted rapidly into this portion of the contents by convection currents in the brine, the heating of the product is accomplished much more rapidly than in a similar product, the components of which have been mixed prior to filling into the container. Ball[23] describes the principle of the method as follows: "In this process, effective use is made of the principle that, in products through which heat passes by means of conduction, the rate of flow of heat is affected very little, if at all, by a wide variation in moisture content. . . ."

"During the application of heat to the container, the temperature rises rapidly within the mass of kernels, just as it does in whole kernel corn, because the heat is carried to the centre of the can by convection currents in the brine. Consequently, the temperature also rises quite rapidly at the lower face of the layer of unconcentrated, finely divided, component.

"While the rate of heat conduction within the cream is low it does not take long for the heat to reach the centre of the layer because: (1) the layer is comparatively thin, and (2) the temperature rises rapidly at all faces of the layer of cream. The interior of the cream layer is the last point in the container to receive sufficient heat to accomplish sterilisation."

The method saves from 40 to 60 per cent. in sterilising time, compared to that required for premixed products. Requiring, as additional equipment over that used conventionally, only extra fillers for the finely divided component, this method of processing, at comparatively small expense, yields a product of markedly improved nutritive and organoleptic quality.

The name of this process, originally "Cremogevac" was changed in 1950 to "Strata-Cook." It is described in U.S. Patents 2,502,196 and 2,502,197.[24, 25]

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[25] C. O. Ball, U.S. Patent, 2,502,197. (Assigned to United Products Co.).

(To be continued)

Dairy Industry Law

A READABLE little work* on the state of the law as it affects the dairy industry, dealing with various subjects in alphabetical order, has recently been published. In his preface, Mr. A. L. Barton informs us that his aim has been to afford a handy reference for anyone wishing to find the legal enactments concerned with any particular aspect of milk trading, but that he has not dealt with ordinary business legislation, which affects any other trader in exactly the same manner as a dairyman.

As far as he goes the author will satisfy those who refer to the book, although in his attempts to simplify he has fallen into the trap, so difficult to avoid under these circumstances, of omitting rather important points and also of being slightly illogical in his classification. Thus the colouring of butter is dealt with under the heading "colouring," but the colouring of cheese under the heading "cheese." Similarly he mentions *Mycobacterium tuberculosis*, *Brucella abortus*, *Brucella melitensis*, and the salmonella organisms under bovine infections, but whereas he gives some space later to *Brucellosis melitensis* and mentions tuberculosis under numerous headings, he does not appear to elaborate either contagious abortion or the salmonella infections. In a later edition of the book much of his apparent inconsistency would be cleared up by further cross-indexing.—T. McL.

* *Dairy Law—Sum and Substance.* By A. Leslie Barton. Pp. 196+vii. Charles Griffin and Co. Price 7s. 6d.

Pea Canning by the Hydro System

(*Continued from page 218*)

The Hydro system has the following points in its favour:

1. There are no moving parts.
2. Maintenance and replacements are negligible.
3. The labour required is materially reduced.
4. Floor space for the line is less than half.
5. An improved product is assured.

Although the plant described is a direct contribution to a better pack, at a later stage in the process, some further improvements are achieved, by which it is possible to produce unbroken process peas in a crystal clear liquor, which resemble the canned fresh garden variety. Flavour, colour, and other characteristics can, as at present, be made to suit specific conditions.

British Marrowfats, Lincolns, and small peas from Switzerland, Holland, and Norway have been tested, all with equally good results. In the illustration it will be seen that the Marrowfats are all whole, but in tests with the small peas 23 per cent. showed a slight fracture, these being all on the outer surface of the bulk, a factor which can be overcome at the later stage of the process.

SILVER JUBILEE SUPPLEMENT

Message from the Founder

AT THIS time of our Silver Jubilee, the thought inevitably occurs to us: "Where shall we be at the end of another quarter century? What lies ahead? What will be the path and what the goal?"

We believe FOOD MANUFACTURE to be the first paper in any language to discuss the chemistry and technology of the commercial manufacture of food in a factory, and we know it now has literally circled the globe. Its start was modest, its early growth slow. After a year or two there was evidence of an acceleration of growth, and now at the end of the first quarter century that acceleration is still evident and there appears to be no slackening.

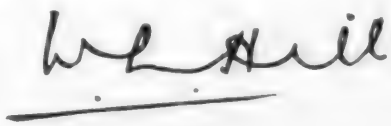
Mr. W. Leonard Hill, chairman Leonard Hill Ltd.

FOOD MANUFACTURE, covering as it has done the large scale packing, processing, preserving, and storing of food products, has contributed to the bridging of the abyss between the lean years and the fat, and to help, to some extent, to avoid the spectre of "starvation among plenty" in future years. It is significant that as it has grown, so also has the greater necessity for such services than ever before known, and it is seemly that FOOD MANUFACTURE should take credit for another development—the application of scientific knowledge for a greater agriculture, for greater protection of growing and harvested crops, and for a saner utilisation of the land surfaces of the world. It has helped to found and nourish in its early years that now world famous journal *World Crops*.

FOOD MANUFACTURE might thus be said to have invested its goodwill in guaranteeing the raw material for its future, and while we know the thanks and gratitude of readers throughout the world will go to its editor and manager, we feel that we can also say that the confidence of its present directorate is not misplaced in the young people now with us, and yet to come, who will continue with this development and take advantage of and utilise those changes in population, in needs, in techniques, and even in popular beliefs, which are bound to arise in the future as they have arisen and been conquered in the past.

In Mr. T. Crosbie-Walsh, the editor of FOOD MANUFACTURE during these many years and in particular in those years of its greatest expansion, the proprietors, his fellow directors, are fortunate in having a colleague who, possessed of the highest competence, is also one who can adapt himself to economic and other influences. He has earned the confidence and thanks of his readers, his colleagues, and staff. It is my pleasure to be in the position to subscribe to this testimonial.

In conclusion, we may be absent on our next Jubilee but, in contemplating the continuance of our work, we hope that we have "reared a monument more enduring than brass that not even the years can destroy."



Progress in Retrospect

J. Valentine Backes, A.R.C.Sc., F.R.I.C.

Twenty-five years ago, when the author wrote the first article in the first number of FOOD MANUFACTURE, he predicted progressiveness, industrial development, the advent of new products, and the dawn of an era of plenty. Mechanisation was to take some of the load of industrial labour and reduce working hours. New materials were to aid sales in creating demand. Better and cheaper production was to reduce the price of food, so that the driving force which kept the human machine running would be the finest that man could develop for his well-being.

REVIEWING this outlook in 1952, how far along this road of progress have we advanced? Granted, we have less labour hours, but we have not the machines to make up for the time lost. We have new materials, not to improve the product, but substitutes for the real thing, to keep production going. As to prices, they are so high that the basic essentials have to be subsidised to keep them within the region of the lower paid sections of the community.

It would be blinding ourselves to reality, therefore, if we said that progress in the food trades had been made during the past 25 years. A walk around the Food Fair brings only a sense of admiration for the producers who have been so successful in maintaining standards under such difficult conditions. This is not progress, it is survival, and this survival is sapping the energies of the food manufacturer to the exclusion of progress.

Food Consumption and Prices

The food consumption figure for 1938 was £1,305 million, whereas in 1950 it had risen to only £1,403 million based on the 1938 price values. This is certainly not comparable with the increased standard of living. In other words, money which is available for food is being spent in other directions.

Comparing wages with food prices, we find that wages rates in 1950 as compared with 1938 were 197 as against 100 standard, but the actual earnings, including overtime, were no less than 240 —nearly two-and-a-half times greater than in 1938! Applying similar figures to food prices, we find the 1950 prices were 182 as against 100 in 1938—just over one-and-three-quarter times as much, and this with the £ standing at 52 per cent. of the 1938 purchasing value!

This lack of spending on the part of the consuming public is not due to lack of enterprise or progressiveness by members of the food industry, but rather to the tangled web of political and statistical juggling which is hampering the development of the food trades.

The Issue of Reduced Allocations

The anxiety of maintaining the reduced allocations of raw materials is blinding us to the real issues. We must first *take food out of politics*. Food has been allowed to become the pawn in the political game. World surveys show that production of practically every commodity has increased, and they furthermore show the vast production potential. It is appreciated that with the advancement of the backward nations, and the introduction of Western habits to the East, a greater demand is put on many of the materials originally consumed by Britain, but production has not by any means reached its peak.

In the case of sugar, for example, the world's production compared with consumption could meet every present-day demand, and in the hands of the industrialist, with freedom of distribution, could provide fresh incentive to increase production as the consuming demand rises. Production develops as the demand rises, but if the demand is reduced, the incentive to produce is lost.

Juggling with dollar and sterling gaps of payment may help the politician, but it does not help to close the sugar gap which this country has faced for twelve years. The sugar is there, but currency juggling will not let us buy it, yet we are allowed to pay twice, or three times, the price when it masquerades under a different name.

Importation of "Sugar"

The addition of a shovelful of gelatine to a 2 cwt. sack of pure granulated sugar permits importation at an inflated price, because the sugar is no longer sugar—it is marshmallow powder!

The utilisation of foreign labour to boil the sugar, and convert it into fondant, with the incorporation of water, which we do not want, and pack it in expensive wooden boxes, which ultimately find their way to the factory furnace, enables the food manufacturer to import a little more sugar at double the price.

The blending of sugar with flour, or some cereal filler, and calling it a "cake powder" eases the conscience of Government officials that sugar is being imported, so the food manufacturer and the public go on paying double for what is legitimately their entitlement. The foreigner is not lacking in ideas in getting around our restrictive controls, and the food manufacturer in this country cannot be blamed if he is forced to buy so long as his own controllers keep him short.

Effects of Misguided Policy

This misguided policy has far-reaching effects. The large profits which the foreign exporter has been able to make have enabled him to set up literally hundreds of small and large manufacturing centres all over the Continent,

and these ever-increasing profits have allowed him to install better and more up-to-date machinery than the British manufacturer.

This is an example of the way in which British food manufacture has been taken away from British labour and industrial enterprise, and the British public left to carry the burden which such loss entails, as well as being charged double the price for such goods which they ultimately receive.

It is true to say that the Butler import cuts have reduced this position, but these cuts were imposed for an entirely different reason.

The purpose was to reduce sterling expenditure abroad. To this end it may be said to have achieved its object, but what effect has it had at home—particularly on the food trades? The method of licensing imports is so devoid of industrial need and is handled in such a dictatorial way by bureaucracy that a new form of parasite is being nurtured and developed to drain away the life blood of the food industries.

Today a Board of Trade Licence has a sterling market value and is traded like any commodity on the market. Invitations to apply for licences bring applications from all and sundry, many of whom have no use for, or knowledge of, the product, other than a realisation that in time of shortage it must have a market. The applications of legitimate users—the food manufacturers — must be scaled down to satisfy the bureaucrats' ideas of equity and fair shares for all. Thus, the manufacturer gets a licence for a fraction of his requirements, which he can import at a reasonable price. For the rest, he is held to ransom by the licence exploiters.

Fondant importation, for example, was reduced by 75 per cent. This caused the foreign manufacturer to reduce his price as his supply was far in excess of licensed demand, but did the food manufacturer obtain the full benefit of such a reduction? What happened was that fondant which could be imported at £90 per ton, duty paid, was being sold for £160 to £180 a ton to the British user by the licence holder. A holder of a licence in the pre-Butler Budget days imported say 500 tons on licence, and he was satisfied with £3 per ton brokerage—a clear £1,500. Today his licence is for only 125 tons, but he is getting £70 per ton profit or £8,750, and this extra £7,250 is coming out of the pocket of the food trade. What is worse, this evil is being perpetuated by the Ministry, and the Board of Trade, restricting licences to those who held them at the dead-line date of the cuts irrespective as to whether they are legitimate members of the food industry or not.

When therefore the position improves, let us hope our planners will have time to devise a scheme that will give us our sugar without all the frills and changes in nomenclature, and should licences still be necessary to issue them first to those who can *prove* they are legitimate food manufacturers.

The Case of Milk Powder

Again, there is the case of milk powder. Granted the home consumption of liquid milk has reduced home production of milk powder, but New Zealand and the Colonies can produce it if the incentive is made sufficiently attractive. What incentive do we give—restriction of allocations to the food manufacturers, who are only too eager to use the greater potential output if the bulk buying political barriers were removed. The case of albumen shows how false values can be created according to the restrictive barriers which prevent free movement. In Germany it is 6s. per lb., in Britain 12s. per lb., and in Southern Ireland 24s. per lb. There is therefore every justification for the plea to take food out of politics and give it back to industry where it belongs.

Labour and Mechanisation

In 1927 the author visualised mechanisation taking some of the load of industrial toil and giving the worker shorter hours. We have the shorter hours but for reasons other than those we forecast! Whether we admit it or not, the fact remains that the most expensive commodity today is "leisure," and most of us cannot or do not know how to use it after we have paid so dearly for it. The 44-hour instead of 48-hour week is costing this country between £600 and £800 million a year. What we get for it is extra so-called leisure, which in many cases cannot be used without spending a further part of the wage packet which otherwise would go on food, to the greater well-being of the community.

Is it not far better to sleep on the floor for one night while the bed is being repaired, than to endure disturbed rest for the remainder of one's life by sleeping on an austerity mattress? Fear and insecurity shut the door to such a suggestion, but remove the fear, the insecurity, and the suspicion, and the British worker will be the first to respond to common sense.

The Workers (Contract of Service) Bill is a step in the right direction. It is a leaf taken from the food industry's book, for it will give to all industrial workers that security and contract of service which has been enjoyed by the food trade workers for so many years.

The Solution of the Problem

To sum up—world production has increased in practically every commodity in which the food trades are interested. Shortages are therefore artificially created by bad distribution, restriction, and political control. As has been suggested above, take food out of politics, and let food be handled and distributed by industry, and so give that freedom to which industry and the community are entitled.

As to labour, *let it put 60 minutes' work into the hour*. The working population of this country is no less than 23 million. If only 50 minutes' work is given for the labour hour, industry is carrying nearly four million passengers, which is equivalent to an increased overhead of £1,000 million per year. Let us save the minutes, and the hours and days will take care of themselves, and so with a renewed effort from industry, labour, and Government alike, we may yet see that development we looked for 25 years ago.

Meat hung in position in a modern container. *Photo The S.M.T. Sales and Service Co.*

The Transportation of Meat and Offal

Elliot B. Dewberry, M.B.E., F.R.San.I., F.R.I.P.H. & H.

This article describes the improvements that have taken place during the past 25 years in the general construction of road transport vehicles for the more hygienic conveyance of meat and offal from abattoirs, slaughterhouses, and markets to retailers.

THE transport of meat was referred to in the Public Health (Meat) Regulations, 1924 and 1925 (S.R. and O. 1924 No. 1432, as amended by S.R. and O. 1925 No. 187) Part VI, "Transport and Handling." The whole subject has received, from time to time, considerable attention by public health authorities, and much has been said and written on this important matter.

Unhygienic Meat Deliveries

The old type of horse-drawn vehicle used for the conveyance of meat and offal had flapping canvas coverings, ill-fitting doors or tailboards, and non-impervious low wooden sides and floor. The interior of the van usually became covered with dust, meat debris collected in the crevices and cracks, and the vertical and horizontal spurs became smeared with blood and fat which attracted flies and vermin. Moreover, the carcasses of meat, sometimes insufficiently cooled and often with the jute or stockinet removed, were stacked on the floor of the vehicle and exposed to dust, dirt, and flies. They were liable also to damage and to contamination from excessive handling. Thorough cleaning of the vehicle was impossible.

In recent years considerable progress has been made, and today many suitable types of vehicle, mostly motor driven, are in use for the conveyance of meat and offal. There is, however, still room for improvement from a hygienic point of view.

A Modern Meat Transport Container

For a modern hygienic container for use in the transport of meat carcasses, it is recommended that the vehicle should have a steel load-carrying frame welded to a low slung chassis. The latter allows of easy loading and unloading and eliminates the need for steps or a ramp. The load is carried by the chassis and not by the body and so minimises any swaying.

The walls and roof should have inner and outer skins with sufficient space between them to allow for insulation. The inside of the container should be lined with non-corrosive metal with corners rounded or curved, so as to ensure that no dust and dirt can collect and to facilitate cleansing. The metal floor should be of the corrugated type with channelling running longitudinally. Proper fitting sliding doors should be provided at each side of the container, and kept closed, except during loading and unloading and cleansing operations. As there is no wood in this type of construction, the interior can be hosed down when required. Permanent fly-proof and vermin-proof ventilation must be fixed in suitable positions.

To ensure even distribution of weight in the suspension of carcasses, suitably designed hanging gear, such as stainless steel rails and hooks, or steel rollers on an overhead endless track (part of the framework welded to chassis) should be installed. This system allows the carcasses to slide along the rail when loading or unloading with minimum effort to the meat porters, and also reduces their need to traverse the floor.

It is preferable to use a separate vehicle for the transport of offal. Heads of animals may be hung up and offal placed in galvanised bins or other suitable non-corrosive receptacles with close fitting covers, which can be easily cleansed. Alternatively, sliding covered trays for offal could be fitted in the meat containers.

Flour as a Raw Material

C. W. Herd, B.Sc., Ph.D., F.R.I.C.

The title of this article is identical with that of one written by the author in the July, 1927, issue of FOOD MANUFACTURE. During the past 25 years, the world has seen three stages of development in cereal chemistry, the pre-war period, when cereal chemists were beginning to establish the significance of the subject, the war period, when changes in feeding conditions set many problems in milling, and finally the post-war period, which has seen even greater developments in the knowledge of the flour as milled and the bread as eaten.

IN a brief review of this type, all that can be done is to examine the changes that were effected as a result of the war conditions and then follow the subsequent results on post-war development. The first consideration during 1939-45 was production, and the second was the nutritive value of the flour and bread produced. Early in 1942 shipping losses made it necessary to increase the extraction rate of the flour from the wheat. This led to a number of problems for the miller and chemist in order to produce a flour from which could be made a palatable loaf of bread; the baker, too, had to readjust his production methods in order to adapt them to the new class of flour which thus became available to him.

Many, at first, were disheartened by the apparent impossibility of producing a good loaf from the flour that then became universal. As is well known, by good team work, vast improvements were effected by all concerned, and the bread today is the best that can be made from 80 per cent. extraction flour.

Another factor presenting difficulty in the production of bread of good quality in the war years was the addition in 1943 of a percentage of other grains to the milling grists, *e.g.* barley, rye, or oats, the amount varying from 10 per cent. to 2½ per cent., and it was not always the same grain used for the dilution, the diluent sometimes consisting of mixed other grains.

The Nutritional Aspect

On the other side of the national story is the nutritional aspect. Before the war years, our millers had realised that white bread was not a complete food, and they themselves had instituted research with the object of improving the bread made from the flour as then milled. They had developed the scheme of the addition of vitamin B_1 to white flour, but at the outbreak of the war it was not ready for complete adoption. However, in 1941 it was put into effect in certain mills. British millers were in fact the pioneers of "flour fortification," as it is now called. Flour treatment was practised in this country 25 years ago, and the development of the processes of flour treatment (whether bleaching, improving, or both) has had for its objective the production of a better loaf and has never been used to pass inferior flour as a higher grade one—in fact, every experienced person in the trade knows that flour treatment just cannot do this.

Full discussions on the treatment of flour by Agene and other agents have been published in recent issues of FOOD MANUFACTURE and also in the present one, and need not be recapitulated in this place.

Extraction Rates

High extraction flour removes the necessity for the addition of vitamin B_1, and the question is whether flour should be milled to a high extraction or whether a lower extraction should be used and nutrients added as "fortification" as is now done in the U.S.A.

The lower extraction rate gives the flour a bolder, more pleasing loaf of whiter colour and is more attractive to many people. In America, Federal Standards control the products of milling more specifically than is done in Great Britain, and enriched flour must conform to their milling provisions and must contain specified quantities of thiamin, riboflavin, niacin, and iron. Such flour may also contain as optional additions vitamin D and calcium.

Much paper and ink have been spent on the question of the addition of calcium to British National flour, but the "ayes" have had it for the time being.

Other Flour Treatments

Reference should be made to a physical form of flour treatment, mainly sponsored by Kent-Jones, using heat as the source of treatment and which might have replaced some of the methods of chemical addition; this method, although advocated by a Departmental Committee, has not replaced the chemical approach, probably on account of the easy application of the gaseous methods and of their combined bleaching and improving action; the physical method did not effect any bleaching.

Although not strictly a flour treatment matter, there may be mentioned the recent work, both in Great Britain and in the U.S.A., on the addition of various chemical substances to bread with the object of retarding staling or of preventing the crumb from becoming firmer as the bread ages. Much has been, and is being, written about the use of various materials to this end.

The object of any flour treatment process is to improve the final product and to increase its palatability; such processes are designed for improvement and, provided no harmful effects on health are present, there can be no objection to their use. The great difficulty is to establish their innocuousness.

The French Canning Industry

H. Cheftel

Director, Research Laboratory, J. J. Carnaud et Forges de Basse-Indre, Paris.

In this article, specially written for the Jubilee number of FOOD MANUFACTURE, the author gives a general outline of the developments which have taken place during the past 25 years in the canning and allied industries in France and African Territories under French Administration.

WHILE there were only relatively few food canning factories in Great Britain 25 years ago, and while in the U.S.A. at that time the art of canning, stimulated by World War I, had already made the big jump from the rule of thumb to the scientific and industrial stage, the French canning industry, despite its past history and number of existing factories, had not yet taken this essential step. Obviously in 1925 it had progressed since the days of Nicolas Appert; in fact, until the early twenties, it had maintained its position and could even then be proud of a world-wide market for its products; but France was only slowly recovering from the war, and her canning industry, like many others, lagged behind in technical development.

Can Making in 1925

In 1925, many canners still made their own cans, the manufacture of which was carried out by hand; the side seamed open top can was yet to be introduced. With the exception of pea and tomato purée canning, operations were conducted with the simplest of machinery, and even in their case no continuous process had yet been introduced. An atmosphere of secrecy still surrounded the factories. Some of the canners actually coded the figures on the gauges of their retorts and believed that they were the sole owners of some procedure that was in fact generally known by others.

Plastic rubber rings were still used on can ends, the hourly capacity of double seamers was around 1,200 cans, and no fully automatic seaming machines were yet available. In some instances, the cans were still sealed by soldering, and this applied even to round double seamed cans, which were closed on seamers fitted with a heated chuck, a procedure, by the way, which was required until September, 1939 for all meat cans made for the Army.

Apart from a small number of larger ones, each producing a few million cans per year, the vast majority of canning factories were small family affairs, among which was the original House of Appert, still in the hands of his heirs, the Chevallier-Apperts. Some factories, notably the larger meat packers, operated control laboratories, but as far as research was concerned the author knows of only one laboratory in the canning industry at that time which devoted some attention to what was considered an unprofitable activity. Trained chemists in the canning industry were rare, and those who existed held executive and administrative rather than technical posts.

Despite this lack of scientific and technical background, the average organoleptic quality of the products was excellent, thanks to the professional conscience of the manufacturers and the great care they exercised in the selection of the raw materials and the attention they gave to the culinary side of their operations. As an example may be mentioned the custom of keeping at least two or three years in storage, previous to selling them, products such as sardines in olive oil or *foie gras*—a procedure which improved the quality and was also a sign of financial possibilities rather remote today.

From Batch to Continuous Methods

It is an established fact that a skilled *chef* does not need much scientific knowledge to prepare very good food—on a small scale. Personal attention to all minute details is however no longer sufficient, nor possible, when the scale of operations becomes larger, and it is this aspect of the situation which makes it so difficult to progress from small scale batchwise operations to large scale continuous production. It may be questioned whether the French canning industry on the whole has yet fully realised this one implication of its development. The number of factories is still too large, the size of many of them too small, and the number of trained technical personnel still insufficient; as a result, the industry is not in a position to appreciate the value of research and of making full use of the vast amount of scientific and technical data on food preservation which has been made available during the last 25 years.

Organisation of Research

It cannot be denied that much progress has been made in respect of technical research and professional co-operation. The organisation by the canners in 1928 of a series of lectures on canning, which later developed into the present *École Technique de la Conserve*—an establishment supervised and subsidised by the Government—and the setting up in 1930, by the largest can manufacturing company, of a research laboratory mainly devoted to the problems of food canning, were perhaps the first steps in this direction. In succeeding years the *École Technique de la Conserve* was provided with laboratories for tuition and research, and with a small experimental station. More recently there was founded the *Institut National de la Conserve*, supported jointly by the tinplate manufacturers, the can manufacturers, and the canners. Its main task is to provide technical advice to the canners and to help them with their problems; it maintains a good library, and publishes an analytical bulletin,

giving abstracts of current technical literature, which has been favourably received by the industry, or more properly by that fraction of the industry which cares at all for technical information.

Connected with the *Institut National de la Conserve* is also the *Centre Technique des Conserves de Produits Agricoles*, an organisation supported by canners of vegetable products under Government supervision, which runs a service for the inspection of canneries and for the control of canned products, and which co-operates with official bodies in the establishment and enforcement of regulations governing canned foods. It also maintains an experimental station for the breeding of geese for *foie gras*, a product which ranks with the vegetables notwithstanding its animal origin.

Space does not permit the inclusion of details of research or advisory activities of this kind, but there should be mentioned the *Institut National des Jus de Fruits* with its little experimental station, and the quite recent establishment in Casablanca, Morocco, of control and research laboratories for the canning of fish, fruit, and fruit products. The latter has been established and is supported as part of the much wider activities of the *Institut des Fruits et Agrumes Coloniaux*, whose contribution to the development of the canning industry should also be put on record in connexion with the canning of pineapple and of citrus fruits in Ivory Coast, New Guinea, and West Africa.

It is fair to state that much of this co-operative work has been made possible by the existence of an organisation set up since the early thirties by the canning industry and allied trades: the *Comité Interprofessionel de la Conserve*, which offered the opportunity of discussing on a national level all problems of mutual interest, and of pooling together the means which were available. This in turn has been largely responsible, together with technical information coming from abroad, for dissipating that atmosphere of secrecy which was characteristic of the canning industry of older days.

Pea canning line at the Cassegrain factory.
Courtesy Cliché Comité Interprofessionnel de la Conserve. Photo H. Lacheroy.

Progress in Can Making Techniques

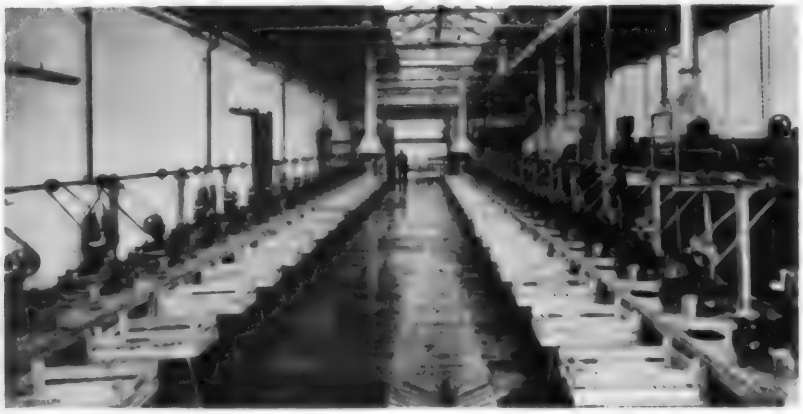
It is impossible to give precise figures for the output of canned foods in France 25 years ago, as no statistics are available. The only figure which is better than a mere guess is for the total consumption of tinplate by the food canning industry of about 45,000 metric tons per year, as against about 95,000 metric tons in 1951. Peas, green beans, spinach, tomatoes, and apricots came first among the vegetable products; sardines, tunny fish, and milk among those of animal origin; *foie gras*, truffles, hams, mushrooms, and a few specialties were important in value rather than in tonnage.

The first technical development which took place, and was in fact a necessary antecedent to further progress, was the introduction of modern American methods of can manufacturing, and the gradual closing down of the small, inefficient can-making shops belonging to individual canneries. At the same time, automatic closing machines became available to the canners.

Soon afterwards the problem of the standardisation of the capacity and dimensions of cans was attacked, with the result that another move, essential for the development of the canning industry, was well under way, not without much controversy. In this particular field of "simplified practice" France has been the first to set the example; those opponents of standardisation who pretend that such rules are too strict do not realise the advantages to be gained from the technical, as well as from the commercial, point of view, by sacrificing to the mutual interest some old habits and some obsolete machinery; they completely overshadow the difficulties which are sometimes encountered.

The fact that discussions on this matter start up again and again, in France and elsewhere, proves how long it takes to bring people to think in terms of modern techniques and to look a little ahead of their immediate problems. For instance, in Italy and Portugal canners still take as a starting point for their ideas of can making the standard 28 in. × 20 in., forgetting that cold rolled plate can be sheared to measure. A number of Moroccan fish canners still rely on the former Portuguese methods of can making which have now become obsolete, Portugal having adopted modern machinery and methods.

In France there are still used some irrational cans whose ratio height/diameter is too large for good resistance to inside or outside pressure, and for automatic handling. They will eventually disappear. There is no doubt that changes brought about by technical evolution always necessitate expenditure and adjustments. Nothing is gained in the long run by resisting progress; in fact, the sooner the unavoidable



Apricot pitting tables.
Courtesy Co-operative Fruitière du Foulon. Photo Jauzac.

changes are made, the less they cost. Who would revert to non-metric systems, in countries where the metric system is already in use?

VEGETABLE CANNING

The canning of vegetables, whose output reached about 3 million cases (of 50 No. 2½ cans) in 1951, was the first branch of the canning industry to turn to modern methods. The main developments have been the following:

Peas

Twenty-five years ago peas were still gathered by hand, and blanching done batchwise in copper pans. At present, a large proportion of the pea crop is harvested mechanically, and most of the factories are equipped with automatic lines. A few British-made continuous pressure cooker-and-coolers have already been in service a number of years, and a new one, designed by P. Carvallo and built by *Établissements Fouché*, in Paris, was introduced a couple of years ago; it deserves a special mention, as it embodies new ideas. The pressure is maintained hydraulically; there are no valves for the introduction of cans, and cans of all sizes and shapes may be handled. The American type continuous pressure cooker-and-cooler is not used, owing to the fact that its capacity is too large for French factories. Hydraulic handling of peas has not yet found much favour, nor—strange to say in a country where the taste of foods is given such attention—methods for estimating the maturity of peas at the time of harvesting.

Green Beans

The canning of green beans has been mechanised only in recent years, mainly because prior to the war no good bean snibbers were available in Europe. Another difficulty lies in the fact that varieties of stringless beans convenient for automatic snibbing were not grown extensively, the French public still preferring the small grades of the string varieties.

FRUIT AND FRUIT PRODUCTS

Thanks to machinery manufacturers in France and to equipment imported mainly from Great Britain, Belgium, and the U.S.A., many fruit canning factories have progressively modernised their plants. The diffusion of technical information has also been an incentive to new developments and ideas, and in the fruit producing sections both of eastern and of south-western France local engineers have put up some fine factories. The fruit mostly used for canning in the east of France is the mirabelle, a small round golden plum; greengages and other types of plums are also packed to a smaller extent. In the south west, apricots represent the main pack, which occupies the canning factories of a number of large growers' co-operative associations. Altogether, the production of canned fruit amounts to about 5½ million cases of 24 No. 2½ cans.

Tomato Purées

The canning of concentrated tomato purées has been second only to peas in technical development, evolving from the Italian type spherical vacuum pans made of copper and the Navarre concentrator with revolving tubular heater, to modern stainless steel apparatus with external heating elements and forced circulation of the product.

Thermocompression is not used to any great extent, but stepwise concentration, first to 18-20 per cent. total solids, then to 28 per cent., is usually the rule. Stainless steel has mainly replaced copper, and modern cyclones and finishers, pre-heaters, and fillers have been adopted in many factories.

A recent introduction, which has been forced upon tomato canners and tomato growers by British buyers of concentrated purée, has been the inspection of the raw stock when delivered to the canneries and its payment according to quality, a system already practised for many years in U.S.A., but one which French canners and growers had never agreed to adopt on their own initiative.

Fruit Juices

Fruit juices have met with varying fortunes. Tomato juice was first canned in 1937 in the south east, and apple juice in Normandy, the country of cider. At that time, only small amounts of other juices were packed. The lack of alcoholic beverages during the last war gave great impetus to the manufacture of all kinds—and unfortunately all qualities—of grape, apple, tomato, and other juices. At the present time the production of fruit juices in France has fallen to a very low figure. In North Africa, on the contrary, citrus juices and concentrates for beverages are on the increase, and the first packs of pineapple juice are being made in other African territories.

Machine manufacturers have been quite active in this field; de-

aerators and flash pasteurisers of French design were already in commercial use in 1938, and French-made equipment of modern type is today available for all fruit juice operations.

Fruit Preserves

Fruit preserves and jams have followed a similar course. In recent years, the production has fallen to a low level, mainly because too many low quality products are still on the market.

With regard to fruit juices and jams, it should be pointed out that food habits in France, and the availability of fresh fruit of some kind all the year round, are also responsible for the low consumption. Fruit juices are seldom taken at meals, but more often as drinks in cafés; thus, they are not considered as a food-like fruit, but rather as a luxury. Neither are preserves and jams a usual feature of the morning breakfast, where butter holds its own; they come into the picture mainly as a dessert, if fruit is not available or too expensive, and generally they are more appreciated by children than by adults.

French fruit juice factory.
Courtesy Co-operative Fruitière du Foulon. Photo Jauzac.

MEAT PRODUCTS

Except in the direction of automatic equipment and machinery in existing factories, nothing much that is new has been introduced in the canning of meat products during the last 25 years. The total output amounts to about 50,000 metric tons. Particular mention may be made of the developments in ham canning, a Paris speciality, and of the introduction of luncheon meat. A number of slaughterhouses with modern equipment have been built, and the use of artificial refrigeration has been considerably extended in all meat canning factories.

Automatic vacuum double seamers are too costly for the average output of single lines of even the largest factories, so that vacuum sealing, when necessary, is still made with the old style tip soldering machines.

In Madagascar, an important place for the production of beef (from the zebu), 12 factories produce yearly about 13 million cans of corned beef and beef in jelly. The modern can factory, built to supply local needs, which is starting operations this year, should lead to a gradual increase in production.

FISH CANNING

The fish canning industry has undergone great changes both in France and in North Africa, where the output in 1951 had reached 2 and 2½ million cases respectively (of 100 ¼ Club cans, or 20 kg.).

Sardines

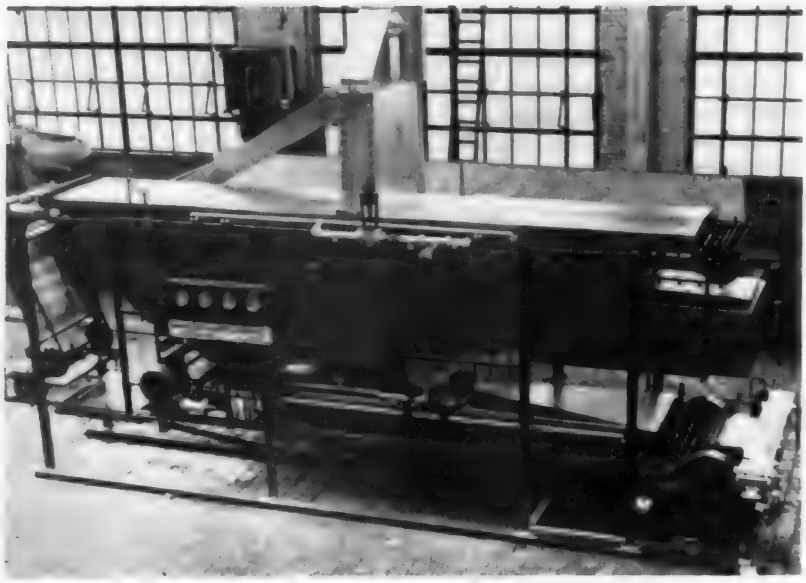
About 1925, sardine canning in Brittany and in St.-Jean-de-Luz (Bay of Biscay) was entirely a hand operation, the filled cans being processed in boiling water. The first stage of development consisted in a better organisation of the factories, many of which were gradually equipped with conveyors, drying ovens (replacing drying in the open air), automatic frying baths, oiling machines, retorts (in place of water baths), and can washers (in place of steel drums in which the cans were rolled in sawdust). The amateur antiquary may still find some examples of the old style factory.

Cooking in steam, carried out in Spain, Portugal, and North Africa, has never been adopted to any extent in France, where a better product, although a more expensive one, is obtained by frying the sardines in oil.

Some attempts were also made to behead and eviscerate the fish mechanically. Various machines were built and tested, and new methods are still being studied, but this problem has not yet been successfully solved. The difficulty lies in the peculiar fragility of the sardine, *Clupea* (*sardinia*) *pilchardus*, WAL., which prevents the use of machines ordinarily employed with herring and other species of *Clupea*. In view of the efficiency and manual dexterity of the girl operatives, it is not easy to devise a machine which would compare favourably with the cost of this type of labour.

Oven cooking was tried in some factories, but without great success; and it is only in recent years that attention has been directed again towards finding a method of cooking sardines in a less expensive and unwieldy way than by frying, and at the same time, better than plain cooking in steam. A new machine, where the fish are packed raw into the cans, then automatically brined, cooked in steam, drained, dried in hot air, and oiled, has been developed by the International Machinery Corporation in Belgium and successfully introduced first in Morocco and later in France and other countries, including the U.S.A.

The technical problems yet unsolved in the canning industry are numerous, but most manufacturers of canning machinery, and even persons or firms who had not the slightest knowledge of canning, started devising sardine cookers of various kinds and shapes



Automatic sardine cooker.
Courtesy International Machinery Corporation.

—many of which have not passed the prototype stage. There is no doubt that, with a little more imagination, much of this effort and expenditure might have been devoted to some other problem, for instance, to the study of the methods for handling the sardines on the boats and from the boats to the canneries.

The fishing methods have also gradually changed during the last 25 years. The gill net, which caught fish of only one given size, has been largely replaced by the ring net, where sardines of all sizes are taken. This has created the need, yet unsatisfied, for a size grader.

The most serious problem of sardine canning in France lies in the fact that the catch is too small and prices too high to compete with foreign production, and the number of factories much too great. The author does not see any remedy for this, unless it becomes possible, firstly to get more fish at a lower price, and secondly to dismantle a fair proportion of the older canneries.

In Morocco, on the other hand, sardine canning has undergone an extraordinary development, the number of factories having increased from 14—most of which were devoted to salting—to 200, and the pack from a few thousand cases to 2½ millions. However, the number of factories appears to be too large, if not for the catch at least for the available markets.

Sardines are also canned in Algeria and Tunisia, but the number and size of the factories have increased and the equipment has been improved, although the development cannot be compared with that which has taken place in Morocco.

Anchovy Salting

The salting of anchovies, *Engraulis enchrassicholus*, has become an Algerian speciality, to the extent that practically all anchovies filleted and packed on the Mediterranean coast now come as salted stock from Algeria.

Tunny Fish

Tunny fish canning has increased steadily in Brittany, in St.-Jean-de-Luz, and on the North African coast. No fundamental change has been introduced in the preparation of tunny fish in oil, with the exception that semi-automatic machines, now in general use, have been developed for slicing the cooked fish and for introducing it into the cans. Steam exhaust boxes have been adopted for large-size cans.

One important novelty is the manufacture of canned tunny fish in brine, a product which has rapidly gained favour and has considerably extended the market for the product. Before this new development, tunny fish was canned only in oil and eaten as a *hors d'oeuvre*; now, the white meat tunny fish *Germo alalunga* GMEL., the only species landed in Brittany, may be used in the kitchen in many different ways.

An important development has been the introduction of Californian fishing methods, *i.e.* live bait fishing and also—at least experimentally—the ring net. These methods have been tried in the Bay of Biscay and in Tunisian waters, not without much opposition from the fishermen, who are diametrically opposed to any change in their traditional habits, and do not seem able to realise that bigger catches and consequently lower prices would result in advantage to everyone concerned. In this field, as in the techniques of can manufacturing and of canning, it is

Packing and trimming of sardines at the René Bézurs factory.
Courtesy Cliché Comité Interprofessionnel de la Conserve. Photo H. Lacheroy.

impossible to withstand progress; in the long run it imposes itself, or else the particular branch affected will eventually die out. In this respect it may be recalled that 25 years ago all tunny fishing units were sailing boats without cool storage facilities; it took about 15 years to effect the change, but now everyone is convinced that engine propelled boats do not frighten away the fish, and that the latter keep better when cool.

Herring

Herring are not canned to any great extent in France. The main port for this fish is Boulogne, on the North Sea, where about a dozen factories, some of them quite large, are located. The herring which are not sold on the fresh market are mostly salted and smoked during the off-season. Canning is almost a side-line. Notwithstanding this, practically all factories, which were badly damaged during the war, have put up new equipment; the herring are packed raw with tomato sauce into oval cans, which are steam exhausted, sealed, and processed.

SUMMARY

On the whole it may be seen that the French canning industry, notwithstanding the handicap of World Wars I and II, has made considerable progress during the past 25 years, both from the technical standpoint and in the volume of production. Despite the fact that fresh vegetables and fresh fruit of some kind are available all the year round at prices which can compete with those of canned products, and despite the present low level of the buying power of the consuming public, the canning industry will continue to progress in France, as elsewhere, as an essential element of modern life.

The first cold reduction plants for steel strip will start to produce this year, and will make available more tinplate to the industry, whose supply of cans is still insufficient. Research, although not supported as it should be, is no longer absent from the picture. Scientific data and technical information are now available to the whole canning industry. Manufacturers of machinery have progressed during the past 25 years, and are now better informed of the needs of the industry. Prejudice against canned foods, particularly in the medical profession, is disappearing, thanks to a better knowledge of the nutritional facts involved. Commercially unexplored fields are still open, *e.g.* soups and baby foods. Areas of new production are being opened up, and there is plenty of work ahead. May we do it in peace!

The Last Four Years of Cereal Chemistry

D. W. Kent-Jones, Ph.D., B.Sc., F.R.I.C.

ON the occasion of the "coming of age" of FOOD MANUFACTURE four years ago, the author wrote an article on cereal chemistry in which the progress made in that science in the previous 21 years was discussed. While it cannot be expected that there is as much to report on in the subsequent four years, nevertheless there has been steady progress in dealing with the problems of control of diastatic activity and of measurement of flour colour and grade; great interest has also arisen on the subject of the treatment of flour by chemical additions. It is not possible to review the main papers published in the interval, but only to draw attention to the general trend.

Diastatic Value

Since what is now commonly known as the "maltose test," was introduced to indicate to millers and bakers how flour is likely to behave in baking from the point of view of the activities of the diastatic enzymes it possesses, there has been a better understanding when and when not to make diastatic additions. For years, when it appeared that there was insufficient diastatic activity, recourse was made to malt flour. However helpful that was, the control of the two main diastatic enzymes, alpha and beta amylase, was by no means certain. The tendency today, especially in the U.S., is to substitute other forms of diastatic aids in place of malt flours.

These new diastatic additions are produced by the growth of certain moulds, such as *Aspergillus oryzae*. This mould is a rich source of both the diastatic enzymes, and from it can be obtained more or less pure white products, rich either in alpha or beta amylase according to the details of manufacture. Such white, diastatically rich products permit a more exact control of the diastatic activity of flour, and there is some reason to believe that such products are also useful as the basis of "anti-stalers." In this respect they are particularly useful since little or no objection could be raised.

Although certain effective anti-stalers are known, such as poly-oxyethylene stearate, everyone is not satisfied that the use of this particular chemical is ideal from the health point of view. This diastatic investigation is still in its infancy, especially in this country, but it seems likely that the near future will throw much additional light on the matter.

Flour Colour

Twenty-five years ago two main problems faced the cereal chemist. The first was what determined the strength of flour, *i.e.* its "bakeability." The nature of the dough was the chief controlling factor, and this was soon found to be dependent on the quantity and quality of the gluten. The introduction of modern dough testing machines marked an important stage in solving this problem. However, the second problem remained, *i.e.* the reliable and exact determination of flour colour as affected by grade.

It had always been comparatively easy to determine the extent of the yellowness of flour, since the yellow colouring matter could be easily extracted by solvents and the tints of the solvents measured without difficulty. What was more important was the precise measurement of the brightness of flour which was mainly dependent on the extent of its contamination with bran powder.

Perhaps one of the most useful practical advances has been the recent introduction of an instrument by which flour colour, as affected by grade, can be determined with accuracy in a quick and simple way. Undoubtedly improvements on the present instrument (Kent-Jones and Martin flour colour grader) will take place, but the principle is likely to represent an important advance which will be of great value to both millers and bakers.

The method was originally described in the *Analyst* ("A Photoelectric Method of Determining the Colour of Flour as Affected by Grade, by Measurements of Reflecting Power," by D. W. Kent-Jones and W. Martin, March 1950, Vol. 75, pp. 127-133), and today over 150 such instruments are in daily use, not only in Great Britain but also in nearly all Commonwealth countries, many European countries, and the Americas. In some mills, it has replaced the ash test, and there seems little doubt that, for control work in the mill, it is especially useful.

Flour Treatment

Perhaps the cereal chemist has spent most of his energies in the last few years in examining problems arising from the chemical treatment of flour, following the "bomb-shell" dropped by Sir Edward Mellanby when he proved that, under certain circumstances, the treatment of flour with the most commonly used "improver," nitrogen trichloride, could affect dogs and produced in them hysteria or running fits. This brought up the whole question of the need or otherwise and the wisdom or not of the treatment of flour with chemicals. It is probably a fair summary to say:

(*a*) The normal treatment of flour with nitrogen trichloride is without any detriment to human beings, but, if dogs are fed with such flour, trouble may arise when the quantity of flour in the diet is high.

(*b*) If proper use is to be made of the wheats of the world, all of which are, as they stand, by no means ideal for breadmaking, then some form of treatment would appear to be highly desirable.

(*c*) From such work that has been done, there appears to be no danger in the use of the other commonly used flour bleachers and improvers such as persulphate, bromate, nitrogen peroxide, benzoyl peroxide, chlorine, and chlorine dioxide.

(*d*) Although doubts have been expressed as to the practicability of the procedure, it is an interesting discovery that unbleached and untreated flour may produce just as good loaves if very high speed mixing (350 r.p.m.) is allowed to take place in the batter stage.

In the particular field of investigations of flour treatment, special reference must be made to the brilliant work of the Flour-Millers Research Association under Dr. T. Moran, which resulted in the isolation and identification of the factor, toxic to dogs, which was formed when nitrogen trichloride acted on flour. By fascinating research work, largely based on chromatographic technique, it was shown that it was the methionine in the gluten which was attacked, some of which was transformed into a substance called methionine sulphoximine. Even small amounts of this substance can cause running fits in dogs in a few hours, but it is apparently without effect on human beings.

It is reassuring to the scientific reader to know the true facts and especially that no ill effects on human beings, dogs, cats, rabbits, monkeys, rats, and other animals have ever been attributed to the other commonly used improvers. Persulphate, bromate, and nitrogen peroxide all have a clean bill of health.

Some authorities have queried the use of the effective bleacher benzoyl peroxide, because of the trace of benzoic acid left in the flour. Investigation has shown that there is no scientific justification for these fears. Also the obvious alternative to Agene is chlorine dioxide, marketed under the name of the Dyox process, and this has perhaps been subjected to more severe investigation than any other treatment, especially at the enquiry in Washington. It has also come out with a completely clean bill of health.

Conclusion

At present there is much activity in the field of the chemical treatment of flour, which is only one aspect of the more general subject of the treatment of food generally with chemicals. Crops have to be protected against pests and ravages, and in this way trace chemicals may find their way into food. Since food has to be grown far from the place where it is consumed, some preservation is essential if there is not to be enormous waste which the world cannot afford. The whole problem must be examined without prejudice; much work still remains to be done and there are many problems still before the cereal chemist.

In Great Britain we have two first class research associations, *i.e.* that of the millers and that of the bakers. What will happen in these important fields in the next 25 years? Is it too much to hope that there will be better use of raw materials, more pleasing and more nutritious bread of better keeping qualities and comparative reduction in costs? If this can be done, the benefit to mankind by these research associations and by all who work for these industries will be immense.

Few research workers have a more alluring field. As one who has worked as a cereal chemist for over 30 years and who has helped to elucidate some of the earlier facts in this science, the author looks forward with interest to seeing how the original work will be exploited, and awaits the future with confidence. What will the cereal chemist of 25 years hence have to say when FOOD MANUFACTURE celebrates its Golden Anniversary?

Food—An Industry

F. E. Thomas, M.A.(Oxon)

The author, who contributed an article in the first issue of FOOD MANUFACTURE, browses over the changes which have taken place in the food industry since then.

WHEN we reflect that hunger was one of the first things that man had to satisfy when he first came to live on this globe of ours, and that since then for many million days many million people have had to face that same problem, we might have hoped that by means of trial and error some reasonably satisfactory solution would have been found. We should not have expected, however, that in a brief 25 years the position today would have been so startling as it is. During the last quarter of a century the whole question of our food supply has undergone a complete metamorphosis and has now become a very serious problem indeed.

Those who can think back a bit further—to the end of the last century—can recall a period when there was, or seemed to be, no problem at all. Not only were there large quantities but a very large choice of foods available. The position was so stabilised that prices of most foods could be forecast for any period of the year and any marked alteration was news. True, we did not get many new foods, like spam and snoek, but there was no need for them.

In the early days when tribes had ceased to be nomadic and had settled down to agriculture and the production of food as a regular part of the daily routine, there were no difficulties, but, as cities grew, food distribution became a major problem, and with the years has increased in importance.

Changes in the 1920's

A big change came over the scene in the 1920's when plenty gave place to shortage. The reason for this was the war, which made the man in the street realise sharply something which had been hitherto only a vague and unimportant fact—our dependence on foreign food supplies. We were near famine, but the whole of Europe was in the same, or worse, position, and the awakening was not pleasant.

As the situation was so vital to us, it had the great advantage of focusing all the forces of the nation on it, among them our scientific strength. Up to 1914 chemists were to be found in plenty in "industrial" works, but food factories were not regarded as being concerned with an "industry." The growth of the realisation of the importance of science in this sphere was amazing.

The big food firms of good repute had always had chemists, but staffs were now increased; medium sized firms who had been content with a youngster who had passed, say, his Inter.B.Sc. and was allowed to work in a fair sized cupboard, launched out into a well-equipped laboratory with a qualified staff; research associations and stations sprang into existence, scientific societies formed food groups and sections, scientific literature multiplied, and FOOD MANUFACTURE was born to record the progress that was being made and the difficulties and technical problems to be overcome, and to keep together the strings of all the activities going on throughout the world.

The Present Position

Where do we stand today? We have had another devastating war to complicate matters, although it is a melancholy fact that a war does result in rapid developments in many directions and not least in scientific progress. Perhaps many of the devices and lines of thought which are now being applied to and found of great value in civil life might never have seen the light of day if the necessities of war had not been their begetters. We certainly do not face world famine, and that is not entirely because of the diminution of populations owing to the war—but are we in this country any nearer the state of being self-supporting?

Not very near, it is to be feared, but as the result of assiduous research in numerous directions we are much better placed than we were 25 years ago and can face the future with some assurance. We have, to begin with, taken a lesson from the squirrel, and by canning, refrigeration, and other methods of preserving food on a large scale are cutting down the waste of more lavish days. But the best work has been done by getting down to first causes and improving the basic sources of food.

Some Recent Work

To illustrate the point, we may refer, firstly, to the recent experiments of artificial insemination of queen bees with selected drones to improve the strain of the offspring with resultant bigger yields of honey, and secondly to the artificial manuring of plankton with such things as phosphates to induce increased size and quantity of the organisms, so that fish feeding on them will also increase in size. This has been done successfully on the "small manufacturing" scale.

Naturally, some details of this "scientific boffin" work has reached the ears of the public in a mutilated form and a small section has raised the cry that we are being fed on chemicals, but the public have changed their attitude very considerably from the famous day when a popular weekly announced that their "special commissioner" had made the dreadful discovery that practically every baker in the land was doctoring his bread with a chemical called sodium chloride, each constituent of which was a deadly poison!

The public are now better informed and realise that the purity of their food is very carefully

guarded today; in fact, there are some who think that Governmental control at times seems to be overdone and food condemned to which no objection would have been raised some years ago—but this is erring on the right side. It is now recognised that the solution of our food problems depends on the work of the scientists.

Chemicals in Food

Will our food become more chemically artificial in the next 25 years? As far as increasing the efficacy and greater yield of certain sources of food, the answer is probably in the affirmative, but many foods, such as bread, milk, and some fruits seem to have reached their zenith as regards quality, yield, food value, and other properties which recommend them. There exists the possibility of the synthesis of many foods of which the world will soon be short by reason of increasing population, such as sucrose, and first-class protein. These may be made from what is at present regarded as waste, or materials put to inferior uses, but the commercial preparations of such foods on a large scale are still problems to be solved.

The consoling feature of these and similar problems lies in the fact that they are a world-wide matter and are engaging the attention of chemists and technologists in many countries. So much has been achieved in the last 25 years that we can look forward with hope and confidence to similar advances in the next few decades.

Food Trends over 25 Years

T. McLachlan, A.C.G.F.C., F.R.I.C.

Have food habits changed during the past 25 years? This is one of the subjects discussed by the author, a contributor to FOOD MANUFACTURE of long standing.

MANY distributors were still selling milk from metal cans when FOOD MANUFACTURE was first published. At the same time a controversy was raging concerning the advisability or otherwise of pasteurisation, but the milk industry as we know it today could not exist without it.

The phenomenal growth of the liquid milk industry has had considerable repercussions on farming and dairy products formerly produced in this country, the home production of fresh and clotted cream, butter, and cheese being affected. Cream completely disappeared from the market during the last war, and now only makes spasmodic appearances. Butter and cheese are still made, but they have become products standardised in colour, texture, and flavour.

Preservatives in Food

Twenty-five years ago a Departmental Committee had issued its report on the use of preservatives and colouring matters in foodstuffs, most of the recommendations of which had been adopted in the Public Health (Preservatives, etc., in Food) Regulations. In effect, these Regulations laid down the principle in British law that preservatives in food were not approved but were tolerated under certain conditions, *e.g.* when it had been found to be impracticable to market a particular food without their help. Common salt, saltpetre, sugars, lactic acid, acetic acid or vinegar, glycerine, alcohol or potable spirits, herbs, hop extract, spices, and essential oils used for flavouring, and substances added to foods as the result of the curing process known as smoking were held not to be preservatives within the meaning of the Regulations. Otherwise only two preservatives were permitted to be used, and these under very restricted conditions. At the time the use of boric acid in bacon and in margarine was prohibited, although they were allowed to be added during the war.

Sodium Nitrite

When canned and cured meats started to reach this country from the United States and elsewhere, containing added sodium nitrite, considerable discussion arose as to whether this substance could be used in this country or not. In some quarters it was maintained that nitrite was a preservative, and in others that it was merely a colouring agent. Eventually the Ministry of Health decided to issue a Regulation putting the matter in order and allowing the use of nitrite curing in this country. This practice has now been followed in other European countries.

The use of diphenyl was also permitted under Regulation 60 CAA of the Defence Regulations for the treatment of wrapping papers for citrus but not for other fruits.

The Preservatives Regulations did not affect the food manufacturing industry to the extent that was anticipated in some quarters. Refrigeration and canning were already developing, and any influence that the Regulations might have exercised was entirely overshadowed by war conditions, and its reorientation of purchasing powers and supplies, and lastly but not least, the effect of what may be termed big business. Examples of this are the centralisation of the fishing industry in one or two places, and the purchase of all milk through the Milk Marketing Board.

Some consequences have been that some wholesalers have run their own factories and retail shops, existing manufacturers have opened their own distributing centres and retail shops, while some retailers have developed in the opposite direction.

Because a prepacked article

sold nationally, or internationally, must of necessity be a standardised one, even though the raw product from which it is made varies from year to year—even from field to field—the large manufacturer must perforce spend large sums of money in research in an endeavour to iron out the inequalities dictated by Nature; in no industry is this more apparent than in the brewing of beer, for which the Spratt-Archer barley has been developed so successfully.

Food Habits

Shortages of certain kinds of foods, which have caused some reorientation of our food habits, result in the main from three causes. It is not necessary here to deal with changes in food habits during the war, although some of them have resulted directly from it because of the financial position and the migration of populations.

Less and less food is sold loose every year. Quick frozen foods are obtainable everywhere. Self-service shops are becoming popular and would become more universal in this country were it not for the use of coupons for rationing. The advantage of the self-service shop is that the housewife can pick up a tray and wander round at her leisure, selecting the articles she desires, calling on an assistant for information regarding products she has not tried before.

Spanish oranges are not so plentiful, but yams, pimientoes, and other fruits, previously unobtainable in this country, can be purchased almost all the year round. Vegetables can be bought in the tin or frozen; in the one case to be warmed before consumption and in the other merely needing to be defrozen and placed in the pot.

If it is not desired to go to the trouble of cooking a meal there is the simple alternative of going to a restaurant or of purchasing a ready-cooked meal, possibly cooked in Denmark or some other country and kept frozen continuously until heated for consumption.

With the housing shortage, smaller families, and the improved conditions of the working classes the tendency in Great Britain has been towards flat life, recognised for so long in France and other countries. This, again, is leading to a decrease in entertaining at home and an increase in restaurant life, a tendency which can be seen even in small towns and large villages. Feeding in canteens has also increased enormously for workers, while their children are catered for at school or in nurseries at midday.

The growth of this communal feeding has tended to lead to an apparent increase in the number of cases of food poisoning, but it is difficult to dogmatise whether this increase is as real as it seems. There can be no doubt that much greater stress has been directed at hygiene in food factories and probably also in canteens and restaurants, but cases of food poisoning are due chiefly to the use of foods cooked or partially cooked on the premises and then cooled slowly through an incubation temperature, at which bacteria can develop rapidly. Before serving, the food is again heated slowly and seldom to a temperature sufficiently high to destroy the bacteria.

Occasionally cases of food poisoning may be traced to imperfectly canned foods, but when this has occurred it has usually been in a country which has been overrun during the war where the revival of the industry has not been complete. Other cases have tended to occur in countries where there had formerly been no appreciable activity in canning.

During the last war the nation, as a whole, was fat starved and, to a minor extent, protein starved, but the shortage of fats was probably felt more than that of any other food. At the end of hostilities people were anxious to obtain all the fat they could for a short time, but this craving was soon satisfied and, on the whole, it is probable that rather less fat is now eaten than before the war.

One commodity returned to the market more slowly than others, namely ice cream, the quality of which was only improved in stages. The demand for ice cream has increased, however, by leaps and bounds, and its sale is probably many times that of pre-war. It is probably the only food which has really increased in demand to any large extent, most other changes in the demands for foods being dependent on availability rather than on any definite trend of popular palate.

To sum up, apart from the demand for ice cream, the most noticeable change in the food habits of people during the last 25 years is the tendency to canteen and restaurant feeding and to the use of prepared cooked or cookable mixtures. The housewife has tended to change from the use of the flour bin and the rolling pin to prepacked food and the tin opener.

Many distributors were still selling milk from metal cans 25 years ago. This cartoon was published in the May, 1927, issue of "Food Manufacture."

Food Cans—1927 to 1952

R. K. Sanders, M.A.,
Head of Research Division, The Metal Box Company.

Twenty-five years ago cans for packing processed food were still being made in this country with hand-soldered side seams and end seams lined with gummi rings; all tinplate was pack rolled and interior lacquers were, at their best, experimental. To men in the industry even these simple statements have implicit in them a conception of the improvements that have been effected in O.T. cans in the intervening years.

IT IS NOT unnatural that the principal improvements in tin cans should proceed *pari passu* with tinplate. In the beginning, the initiative was all with the can makers. They had to teach the tinplate makers—the rollers, tinmen, and sorters themselves—what high speed can making needed in the way of squareness, flatness, cleanliness, and freedom from waster blemishes, and within a few years the tinplate industry had responded to an extent where even pack rolled plate in 1935 was almost unrecognisable as the descendant of the tinplate of 1920.

Then came the strip mill at Ebbw Vale, and from it poured into the can factories tinplate that was flat and square and perfectly sheared and stacked — tinplate almost free from grain direction and temper rolled to make it suitable for making ends or bodies at will. This cold reduced plate was also a great improvement on pack rolled plate in resistance to corrosion by acid food products. Rolling in packs necessitates high phosphorus content to prevent sticking, but rolling in the strip permitted a much lower phosphorus content which, although not equal to that of the famous American Type L plate, was low enough to decrease very materially the liability to form hydrogen swells.

Electrolytic Tinplate

The introduction a few years ago of electrolytic tinning of plate already cold rolled in the strip may well be said to constitute a revolution in the can making and canning industries. As yet the art and science of making electrolytic tinplate is young, even in the United States. The only commercial qualities available in Britain at the moment, carrying 4 or 8 oz. of tin per basis box, are not sufficiently corrosion resistant for universal use in O.T. cans, but are of wide applicability for most meat and vegetable products.

The important points, however, are first that electrolytic tinning gives us control over the quantity of tin applied to the steel and the uniformity with which it is applied far beyond that over the application by hot dipping; secondly —and much more important— current research in the United States indicates that in a few years' time it may be possible to control the annealing and pretinning treatment of the steel in a way that was not possible with the older methods. This will result in the production of electrolytic plate of economical coating weights which will be superior in corrosion resistance to hot dipped plate and also uniform in that corrosion resistance to a degree undreamed of hitherto.

Lining Compounds

The least obvious, but in some ways the most important part of a processed food can is the lining compound in the end seams. Except that end lining compounds are now usually grey in colour whereas 25 years ago they were red, only the expert would know that they have changed at all in that time. They have, however, improved very significantly in sealing quality, and particularly in ability to render the seams more resistant to the mechanical abuse inseparable from high speed canning operations.

The use of reconstituted latex as opposed to natural rubber latex has made the modern sealing compound stay in the seam instead of softening under steam; neither does it squeeze out all over the closing machine under the pressure of the seaming operation. This same modification has also opened the way to the development of compounds sufficiently steam resistant to permit steam injection at the moment of closure in order to enhance vacuum and so prolong shelf life and permit of processing at higher temperatures.

Side Seams

The other seam in the O.T. can, the soldered side seam, almost perfected when high speed machine soldering replaced hand soldering, has made one notable step forward in recent years. During the second world war, the necessity for economy in the use of tin led to intensive study, both in Great Britain and in the U.S.A., of the properties of solders containing very low concentrations of tin. As a result of these investigations it was discovered that a lap joint made with an alloy containing roughly only 2 per cent. of tin and the remainder lead was in fact superior to one made with the conventional alloys containing 35 to 40 per cent. of tin. It is now common practice to use no tin at all in the "solder" fed to the machines, since the tin on the plate is sufficient to provide the necessary concentration of 2 per cent. With this tinless soldering the open laps that occurred when cans were stored unused from one season to another have become a thing of the past.

Protective Lacquers

In the field of internal protective lacquers, there has been a steady improvement in the quality of the traditional acid resisting and sulphur resisting lacquers for fruits and vegetables, and the in-

troduction, in the earliest days of the war, of the 100 per cent. phenolic resin lacquers improved out of recognition the appearance of solid meat products and of the opened cans that had contained them.

Many attempts, some highly successful on all grounds but cost, have been made throughout the years to prolong the shelf life of canned fruits by total or partial lacquering of the interior of the can after fabrication was substantially complete. Methods have now been devised whereby it is possible to put such "long life" cans on the market at only a marginally increased cost.

The Decorated Processed Food Can

The latest and most spectacular of all developments is the decorated processed food can. Although this type of can, familiar to us all during the war through the American luncheon meats, has been long established in America, the special sizes, coatings, inks, and varnishes developed there to withstand processing in steam were not available to us, and systems had to be developed from sources native to this country. They have been developed for tinplate and for aluminium, for ends and for bodies, and even for cans to be scored and flattened for export to countries where facilities for decorating tinplate do not as yet exist.

Research on Fruit and Vegetable Products

W. V. Cruess

Agriculture Experiment Station, University of California.

The author, professor at the University of California, here describes some recent research conducted by the Food Technology Division at the University of California.

Dried Fruits

AN extensive investigation by J. H. Kilbuck on the effect of maturity, time of picking, locality where grown, and other factors on the quality of prunes for drying indicates that in some areas the fresh prunes should be picked earlier than at present in order to secure dried prunes of optimum firmness, colour of flesh, sugar content, texture, density, and flavour. H. J. Phaff and B. S. Luh have isolated and studied the yeasts that sometimes cause spoilage during fruit drying. Vinegar flies are important carriers of these yeasts. Dehydration instead of sun-drying prevents such spoilage during drying, but is not practicable in all cases, particularly with figs which are always dried in the sun. In cut fruits sulphur dioxide prevents yeast growth.

W. V. Cruess and E. Boynton found that in the dehydration of apples the final SO_2 content is not much above the initial SO_2 at start of drying. Therefore over three-quarters of the SO_2 is lost during drying since the fruit dries away about 5 : 1.

D. Musco and W. V. Cruess were successful in incorporating 50 per cent. or more of dried fruit in breakfast cereals such as flakes, shreds, and "grape nuts" type cereals. Eventually perhaps it may be possible to have breakfast fruit and cereal in a single product.

R. H. Vaughn has been active in studying ways and means of improving sanitation in dried fruit plants, one means being the sterilising of sorting belts by use of chlorinated water, which is applied continuously to the belt on its return trip while empty.

G. Mackinney and graduate students have established that certain aldehydes are concerned in the browning or blackening of dried fruits on prolonged storage, and that the well-known Maillard amino acid-sugar reaction is not the whole story. Low storage temperature greatly retards the browning reaction as does also adequate SO_2 concentration in the fruit. The browning reaction is apparently not dependent on oxygen, and is in that respect different from the browning of the cut surface of a raw apple, peach, or potato.

E. M. Mrak and colleagues have completed several years' study of the yeasts occurring in and on dried fruits and have established effective control measures. One such is the application of the vapours of ethylene oxide or propylene oxide in sealed packages of high-moisture dried fruits, to kill yeasts and moulds. This is now in commercial use.

Frozen Fruits and Vegetables

M. A. Joslyn and assistants have completed comprehensive research on the roles of various sugars and syrups used in the packaging of fruits for freezing, such as their relative effects on flavour, colour, and aroma, their effect on ascorbic acid oxidation, oxygen solubility, etc. A series of more than eight papers have appeared recently on this research.

Joslyn and Cruess are finding that oxidising and other enzymes in frozen fruits and vegetables have not been given sufficient attention by the industry. Too often peroxidase is not destroyed in the blanching now used; consequently subsequent enzymic deterioration of the products in freezing storage occurs.

Cruess has found that various fresh unsalted meats and fish keep much longer frozen, and to many consumers taste better if mildly smoked before wrapping and freezing. He has also found that aluminium foil is a great improvement over "locker paper" as a wrap for fresh meats, fish, and poultry, as it greatly prolongs storage life by retarding staling and drying.

Fruit Juices

A successful method of producing juice from fresh prunes and plums was devised by Cruess and

Nussenbaum by using a pectic enzyme in the pulped fruit to destroy pectin. Pectins make the pulped or crushed fruit so "gummy" that it cannot be pressed unless it is enzyme treated. The fresh juice is superior to that made from dried prunes.

Frozen concentrates of prunes, apples, and plums were prepared, stored, and were approved by taste panels. They may in time appear in grocery store freezing cabinets alongside frozen orange concentrate.

Much research is under way by C. Sterling on the histological changes in blanching and freezing of lima beans and on various methods of testing lima beans for optimum maturity for freezing.

Cruess found that addition of about 3 per cent. of cane or beet sugar to peas at the time of packaging for freezing greatly improves them for most consumers.

Surplus Fruit Utilisation

California produces surpluses of certain fruits, and their profitable disposal is a problem. Cruess, Mrak, Musco, Rivera, Hohl, and others in the Division have over the past 25 years conducted a great many experiments on new and improved products in which surplus fruits can be utilised. Among these are breakfast cereals, cake flours, candies, new beverages, frozen concentrates, and frozen specialities, ice cream and ice cream bases, granules, powders, baked products, and others. Most of the results have been published and will not be reviewed here. Some of the results have been put into practice, others are "on the shelf" awaiting some venturesome processor to give them a try-out.

Olive Pickling

The various problems of green and of ripe olive pickling still receive much attention from Vaughn and Cruess. Suffice it to say that this research work has established the Spanish Green olive process in California on a large commercial scale, has eliminated spoilage in the pickling of ripe olives, has indicated how shrivelling can be prevented, has shown how the black colour of ripe olives can be retained and improved, and how quality and appearance can be improved in other ways. California cans about 1,500,000 cases of ripe olives annually.

Whither Food Chemicals?

H. R. Jensen, M.Sc., F.R.I.C.

A quarter of a century has elapsed since the publication in FOOD MANUFACTURE of the author's earlier comments on certain aspects of food regulations. Further observations were made in 1940 as a result of a full examination of the Foods and Drugs Act, 1938. The author now reflects on the actual course of events which brought modern food technology into being.

SOME doubts expressed in my earlier comments are seen to have been justified in respect of omissions and definitions in the Act and the obsolete procedure in cases of infringement. The 25-year-old demand for a fully representative "Board of Reference" to advise and act, even prior to prosecution, has not been met. Complicated technical and legal issues may still be adjudged in the absence of qualified assessors, with a risk of serious injustice to various interests. It is true that a chain of Ministerial Advisory Committees is now operating which may prevent arbitrary decisions and take account of modern conditions and practice.

The emphasis of legal controls is now far away from the often hair-splitting proceedings arising from insignificant accidental metallic and other contaminations. Even the descriptive word "adulteration" is almost superseded in the literal sense, as for example in the unlimited undeclared substitutions by margarine in so many products.

Trace Elements

Various expert sub-committees of analysts have, after long investigations, drawn up realistic permissible schedules for such trace elements as lead, arsenic, zinc, and copper. Precision methods for separation and determination of very small quantities of such metals are now in use. Copper and zinc, in view of their physiological functions, are given reasonable latitude. Tin, nickel, and cobalt are scarcely suspect. Silver, arising out of electrolytic sterilisation of fruit juices, etc., has been limited abroad to two parts per million.

Drastically low limits are proposed for lead and arsenic. The latter, as is well known, has low toxicity in some organic and natural forms, *e.g.* shell-fish. It is not so long since there was a considerable arsenical contamination of a cheap chocolate, which had escaped detection by any public analyst. This product, having a content of 40 parts per million of arsenic (dosage about 1/50 grain), had been consumed on a big scale for years by children. The source was a native iron oxide apparently containing an inert insoluble sulphide and was used as a colour enricher. No evidence of ill effects ever came to light.

Insecticides and Fungicides

For some years the outstanding feature of food technology has been the use for many purposes of hundreds of complex chemical substances which, in quite small amounts, produce a wide range of physical and chemical effects. Few chemists can have anticipated either the extent or the speed of such developments.

It may be recalled that the use of these ancillary substances ex-

tends from the soil, seed, root, and leaf of food plants, from animals and fodder, right up to food and confectionery products, processes, premises, plant, and packaging. Even the sap of plants may now be inoculated with potent "systemic" poisons. Such are being tested on the cacao tree to destroy the mealybug sucking insect which spreads the incurable swollen shoot virus on the Gold Coast.*

In Britain alone three million acres of crops and pastures are sprayed annually against weeds and insect and fungus pests. The very active organo-phosphorus insecticides, and the aromatic dinitro compounds used as weed killers are so toxic to man that a Working Party of the Ministry have drawn up regulations for protective clothing, washing facilities, etc. In view, however, of the further hazards from the extensive use of the low toxicity insecticides, there is a demand for much more drastic regulations involving the employment of trained operators, who would carry out continuous tests at all stages to ensure safe residual tolerance limits as enforced by the U.S. Pure Food Administration.

Chemicals in Food

Of more significant urgency to food manufacturers is the very large usage of a host of synthetic preservatives, emulsifiers, antioxidants, antibiotics, pesticides, detergents, and so on. This subject has now received highly competent and serious consideration in recent symposia and publications.

Most of the *desiderata* and difficulties of the problem have been discussed and valuable courses of action proposed; this applies especially to the rational basis for dosage limits drawn up by Prof. A. C. Frazer. Plans for use and control will obviously require much research. There are questions of classification, standardised composition, interactions, and derivatives which provide a limitless field for team work and judgment of a high order.

Nevertheless, there is no reason for panic or for a visualisation of carcinogenic or other fearful theoretical possibilities. Human resistance and adaptability, and the idiosyncracies of dietary science, do not encourage dogma as to the effects of this or that over the years. Meanwhile aids to efficient and competitive manufacture and progress should not be unnecessarily hampered.

A simple prohibition of most of the chemical additions in actual use in food is now admitted to be impossible and unnecessary. Certainly it would be difficult in most cases for a prosecution to prove such additions either injurious or to the prejudice of the purchaser as required under Part I, Sec. 1(1a) or 2(1a) of the 1938 Act. It is equally impossible to make any "permanent" list of permissible additions for yet unknown substances for unknown purposes. It will be noted that in spite of detailed U.S. Food Law schedules for approved additions, by far the largest use of chemicals has developed in America.

The Act of 1938, together with the Food Preservative Regulations (1927-28), clarified many of the legal uncertainties then existing as to non-food ingredients. It also provided a flexible basis, as intended, for the innumerable changes and controls required by the needs of the war and post-war periods. However, as was foreseen, it is now evident that the basis was too rigid to cope with the surprising technical developments. No doubt industrial scientists had very little say. This will now be remedied with the appreciation that such regulations must in future take a "serial" form.

Methods of Control

Proposals are now drawn up by such authoritative bodies as the Food Standards Committee, the Advisory Sub-committees, and the Joint Committee on Preservative Regulations. The Advisory Council of the Medical Research Council have drawn up proposals for the control and use of all chemical additions and contacts based on exhaustive physiological and other tests. Their interim ruling makes a manufacturer specifically responsible for the use of any new substance in food processing, with which distribution should also be associated.

Perhaps another restraint which is not far distant is the placing of a formal responsibility on all chemists directly concerned with the use of chemicals in food.

In these new advisory organisations there is still doubt whether practising technologists have adequate representation and influence. There is usually a lag between official knowledge and advanced technical practices by reason of commercial and professional secrecy, and also outside ignorance of trade and industrial objectives. The plan to collaborate with U.S. Government agencies should be very helpful in view of the important work on toxicity carried out by the Food and Drug Administration, and the Delaney Report to Congress on 704 chemical substances in use, of which 40 per cent. have been classed as of doubtful harmlessness.

Anomalies in Food and Drug Act

Finally, it is pertinent to note certain anomalies in the application of the 1938 Act. What, in fact, is the legal position of a harmless addition, such as an antioxidant or vitamin, neither needed nor used as a "preservative"? Again, the position of saccharin and dulcin is vague. As ordinarily used they can no longer be prohibited as injurious, and if used as a sweetening agent in any food products, a declaration of their presence on the label should fully protect the consumer. In view of the fact that boron preservatives have now long been permitted to be used in margarine, they may be considered unobjectionable for limited purposes.

The use of sulphur dioxide is sanctioned in considerable amounts in ingredients not for direct consumption, but there is little knowledge of its effects in combination. In view of its direct usage it is surely desirable to reduce the excessive amount permitted in gelatine. Sulphites are

(*Continued on page 243*)

* A discussion on this was published in *Nature* (**167**, 260, 1951; **169**, 120, 334, and 536, 1952). In the last note it is stressed that the swollen shoot virus exists not only in the cacao, but also in many of the forest trees around.

Chocolate and Confectionery

R. Harold Morgan, M.Sc., F.R.I.C.
Consulting Chemist.

A quarter of a century has elapsed since the author, in an article published in the first issue of FOOD MANUFACTURE, said that "the sugar confectionery industry in recent years has, in methods and outlook, undergone a change probably greater than that ever experienced by any other industry. This ancient and conservative art, whose secrets have been most jealously guarded throughout the ages, is now rapidly developing on the basis of scientific method." The intervening years have seen the industry develop into one of the first rank, with outputs, thanks to the introduction of specialised machinery, far beyond the wildest dreams of the "old timers."

UP to the beginning of the last war progress was exemplified by improved methods of manufacture: better quality and finish, improved keeping properties, and pack and presentation of the goods. Inevitably, the war period seriously interfered with the industry, and manufacturers must be congratulated on their successful efforts to overcome restrictions in raw materials of all kinds. Even today they are faced with many difficulties, but examination of present-day products shows that progress is being maintained so far as conditions allow.

Design of Equipment

There is no doubt that improvements in design of machines, together with the introduction of new types for specialised uses, have played a great part in the development of the industry during the past 25 years, coupled with the application of scientific principles which have rendered such improvements possible.

In sugar-boiling there has always been a danger, with large batches, of too much inversion and colour formation at the high temperatures necessary to yield a low moisture product. For successful keeping properties high boiled goods must have a low moisture content, in the region of one per cent., and a minimum of invert sugar, as the latter attracts moisture from the atmosphere. Vacuum pans have been used for some time, and the improvements which have taken place have been in mechanical details. The batch vacuum cooker is useful in medium sized factories. With this unit the sugar is cooked in a pan and the syrup sucked into the vacuum chamber for final treatment. A further development is the continuous vacuum cooker which permits of high outputs of boiled sugar.

Probably one of the most interesting developments of the past quarter of a century in connexion with sugar boiling has been the introduction of the Microfilm automatic continuous sugar cooker. As the name suggests, the syrup passes in a film on to hot tubes and reaches a high temperature in a matter of seconds. A further development of this film cooking has just been placed on the market in which the advantage of the film cooking and vacuum cooking are combined.

Toffee Manufacture

Toffee boiling has long been carried out in a pan fitted with a centre agitator. Owing to the nature of the ingredients, heat transfer is slow and patch burning can easily occur with insufficient agitation. A great improvement is the under-driven toffee mixing and boiling pan with a specially designed beater which sets up a centrifugal force thus propelling the whole contents of the pan against the heated surface. This gives a quicker boil, and there are no stirrers to remove before lifting the pan.

Plastic centres have become very popular in recent years owing, no doubt, to the introduction of the centre filler machine. The preparation of the centre material was an art requiring the services of a skilled sugar boiler, but today the centre filler pumps the centre material into the sugar casing as it is being formed by the batch former. The plastic machine is well known and features gradual compression. The seamless tablet machine is a further development of the ordinary plastic machine, and delivers the formed tablets separately instead of in a chain. Drop rollers have been considerably improved mechanically, and this is revealed in the improved appearance and finish of present-day drops.

Starch depository has been in existence for many years and the Mogul machine is familiar to all. A recent development is the depositing of cream centres on to a special type of rubber mat. This patented method of depositing cream centres appears useful for smaller productions, and its further extensions will be watched with interest.

Chocolate Making

On the chocolate side of the industry there have been considerable improvements in machine units as well as the introduction of new types. Continuous roasters have not replaced the old batch roaster, but it does appear that machinery manufacturers are endeavouring to incorporate the advantages of batch roasting into a continuous process, *i.e.* to roast and not merely to dry. The metal disc type of cocoa liquor grinding mill is an important development, but some makers still prefer French burr stones, more especially for chocolate production.

Refining is probably the most important stage in chocolate manufacture, and many improvements have been carried out on refiners during the past quarter

century. These relate to the construction of the rolls and the constitution of their metal, to the grinding of the rolls, the method of mounting the rolls, and to gear ratios.

Conches and Enrobers

Conche treatment is still the essential final stage, and minor modifications have reduced the space occupied and the power expended. Various rotary type conches have been introduced, but it is questionable if they really do equal the results obtained from the orthodox type of conche in a given time.

Enrobers have increased in size and capacity, and this has necessitated a corresponding increase in cooling capacity. Overall tunnel space can be reduced by the use of a circuitous type of cooler. Moulding plant has shown considerable development, particularly in the saving of labour by the use of fully automatic units in which the moulds are not touched by hand.

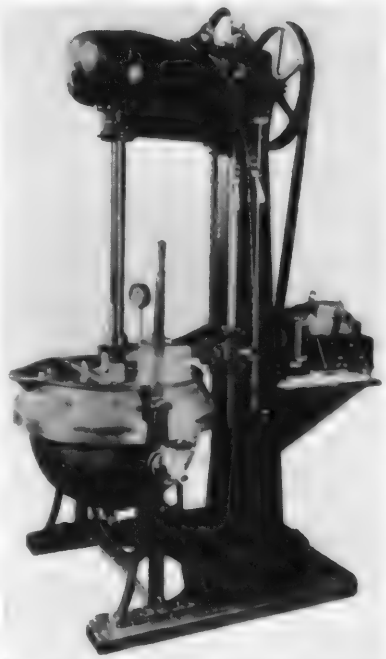
New Lines

It is possible to refer only in a general way to the numerous chocolate and confectionery lines which have appeared on the market during the last quarter of a century. The increase in wrapped goods is particularly noticeable, and wrapping machines have reached a high standard of efficiency and output. Many old favourites are still on the market, though now protected by Cellophane, waxed paper, or foils. Large piece goods—originally 1d. or 2d. but more today—have achieved great popularity and are still in public demand. Then again there is the filled bar, a very different product from the one-time cream bar which contains various kinds of solid centres, and the multi-centred bar.

With the present high price of cocoa beans this type of bar considerably reduces the proportion of chocolate required.

Scientific Control

The application of scientific principles has played a great part



A vertical mixing machine with stirrers in working position.
Photo William Brierley, Collier and Hartley.

in the development which has taken place in the industry. The laboratory is now an essential part of factory organisation and where full-time staff is unpracticable, recourse is made to consultants with the necessary facilities and experience. Apart from examination of raw materials and finished products it has been found that the chemist can be useful in every phase of manufacture and even in marketing.

Work has been carried out on the effect of heat, light, and humidity on chocolate and confectionery lines and the results obtained have been of particular value to exporters. Insect pests have been a source of considerable annoyance and of financial loss, but this has now been checked as a result of scientific investigation into methods of pest destruction.

Avoidance of Fermentation

Thanks to the detection and prevention of the conditions which permitted the growth of osmophyllic yeasts, fermentation in cream centres now rarely occurs. The introduction of lecithin to the chocolate industry was an outstanding event which occurred during the period under review; the first article on the subject by the author appeared in FOOD MANUFACTURE in 1930.

Consideration of the products of the industry from the physico-chemical point of view has shown that proven methods of manufacture, resulting from long years of hard earned knowledge, are based on sound and accepted physical laws. The realisation of fundamental principles of this nature has assisted the progress of the industry and, upon such a basis, progress will continue.

Whither Food Chemicals?

(Continued from page 241)

banned in bread flour but not in cornflour and cereal products.

Now that Agene treatment of bread flours is known to cause loss of the valuable methionine of the gluten, it would seem necessary to ensure that no such changes occur with the proposed Agene substitutes.

As to operational requirements, Prof. H. D. Kay has supported the need for a central laboratory competent to approve or otherwise of chemical additions and to carry out regularly the necessary specialised tests, the standards to be embodied in a food "Pharmacopoeia." Bagnall and Stock also, incidental to an investigation of vitamin A commercial preparations (*Pharm. Journ.* Jan. 1952), conclude that large district laboratories are overdue. They should be staffed by experienced workers and be fully equipped to carry out the elaborate techniques of today and tomorrow. They urge that the resources of such laboratories must at least equal those of the larger manufacturers.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

Silver Jubilee Greetings

A selection of the letters received from some of the advertisers in FOOD MANUFACTURE on the occasion of its 25th birthday.

May we congratulate you on achieving your silver jubilee, and hope that you will carry on with the good work until you reach at least a century.—*Accles & Pollock, Ltd.*

The expansion of the British food industries over the last 25 years has been the direct result of improved methods of working and the service of the world-wide display of goods afforded by the pages of the trade press. FOOD MANUFACTURE "blazed a trail" in their field and your progress has been such that you can look back with pride on your achievements. We offer our heartiest congratulations and best wishes.—*Advita, Limited.*

May I convey to you my company's congratulations on the 25th anniversary of your journal. With the threatened crisis in the world's food supplies, journalistic attention to increased efficiency in food handling and processing will become more important, and we feel sure that your journal will play its part in this.—*The A.P.V. Company, Limited*

Hearty congratulations on attaining your 25th anniversary. May your reputation continue "stainless" as the goods you successfully help us to sell.—*Associated Metal Works (Glasgow), Ltd.*

We have always been interested in watching the continuous and very successful development of your publication over the past 25 years. You are to be congratulated on the present high standard of your paper due to the excellent service you have rendered to the food manufacturing trades.—*Autopack, Ltd.*

We seem to have been reading your journal for nearly 20 years, and we should like to take this opportunity of congratulating you on the uniform excellence of your production. You seem to have set yourself a very high standard of quality both in the way in which the journal has been produced and in the articles themselves—a standard which is often envied, occasionally equalled, but never bettered. With every good wish for the next 25 years.—*The Bear Honey Company, Limited.*

For a very long time now we have contributed to FOOD MANUFACTURE and it is very seldom that we read a number without learning something fresh and of assistance to us even though we are specialists in our limited line of productions. We feel that this is a fitting opportunity to congratulate FOOD MANUFACTURE on its high standard and offer our good wishes for the future.—*The Beddington Nut and Produce Co., Ltd.*

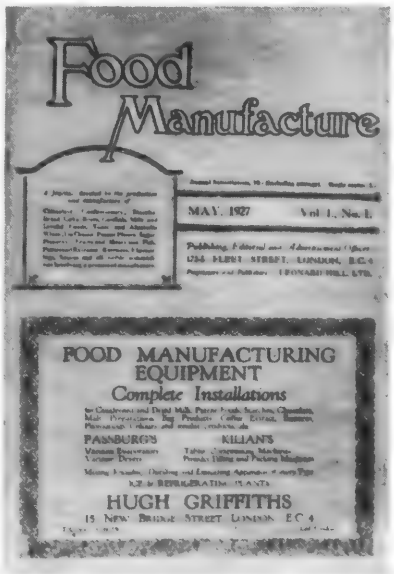
Will you allow us to offer our congratulations in connexion with the publication of a special number to mark the 25th anniversary of FOOD MANUFACTURE. In our opinion you have maintained a very high standard over these first 25 years and we trust that continued success will attend your efforts in the future. We have formed a very high opinion of your journal as an advertising medium.—*Begg, Cousland & Co., Ltd.*

Indiscriminate advertising is a waste of money. It is necessary to select carefully the soil in which to sow the seed. In our experience FOOD MANUFACTURE is a fertile soil in which to carry our advertisements for the twin cylinder drying machines we manufacture for drying milk and other liquids.—*Bertrams, Limited.*

It gives us great pleasure to congratulate you on the 25th anniversary of your excellent journal. We have always found FOOD MANUFACTURE of extreme interest and we know that it is regarded in all branches of the food industry as a journal of authority, containing as it does so much information on matters of common interest. It was because of the high regard in which FOOD MANUFACTURE is held that we decided to advertise our essences and fruit juice products therein as we know it is an effective medium and one from which we shall obtain excellent results.—*The Birmingham Chemical Co., Limited.*

We send you heartiest congratulations on your silver jubilee and wish you every success and increasing popularity in the future.—*E. W. Bliss (England), Ltd.*

We would like to take this opportunity on the occasion of your 25th anniversary of congratulating you on the high standard set by FOOD MANUFACTURE these last 25 years. Apart from being regular advertisers in your journal, we also find it most interesting to read. You must justly feel proud of the service you have rendered to the food industry.—*Fredk. Boehm, Limited.*



A reproduction of the cover of the first issue of "Food Manufacture."

The steady growth of your very good trade journal, FOOD MANUFACTURE, is proof in itself of the service which it is rendering to the trade. Appreciating the difficulties which must beset the production of such a journal in these days of austerity, we congratulate you on a fine publication and trust that the progress made during the past 25 years will continue as time goes on.—*R. W. Bollans & Co., Ltd.*

We are happy to congratulate the publishers and editorial staff of FOOD MANUFACTURE on the occasion of its 25th anniversary. We are pleased to have been associated with this responsible journal in the past and we look forward to an equally pleasant association in the future.—*Bowaters Sales Company, Limited.*

We should like to take this opportunity of offering our sincerest congratulations and best wishes for your continued success in the future.—*S. N. Bridges & Co., Ltd.*

May we congratulate you on the ground you have covered since you set off on your journey, 25 years ago. Your tenacity and endeavour, have brought you well deserved success. Good luck and best wishes.—*Wm. Brierley, Collier & Hartley, Ltd.*

We appreciate very much the opportunity of sending to you on the occasion of the 25th anniversary of FOOD MANUFACTURE, sincerest congratulations and best wishes for the future success of this most interesting and informative publication.—*The British Hydrological Corporation.*

Please accept our most cordial congratulations on this 25th anniversary of your excellent journal. We have always found FOOD MANUFACTURE both interesting and informative as well as extremely helpful to us as advertisers. We sincerely hope that it continues to remain the force in the food industry that it undoubtedly is at the present time.—*The British Wedge Wire Company, Limited.*

We would like to take this opportunity of congratulating you on 25 years' successful publishing.—*Thomas Broadbent & Sons, Limited.*

Heartiest congratulations to FOOD MANUFACTURE on reaching its 25th anniversary. I am sure that in the years to come you will maintain the extremely high standard of editorial matter and presentation. As you know, we place advertising with the journal on behalf of our subsidiary, Lewin Road Sweepers, Ltd., and I am glad to say that this company's sales of mechanical sweepers for food factories have shown a remarkable increase—directly attributable to these advertisements.—*J. Brockhouse & Co., Ltd.*

May we congratulate you on reaching the 25th anniversary of FOOD MANUFACTURE. We find this journal of great interest, both for its news and for its advertisements. We wish you all possible success for the future.—*H. P. Bulmer & Co., Ltd.*

Will you please accept my firm's heartiest congratulations on the occasion of the silver jubilee issue of FOOD MANUFACTURE, coupling with this the name of your esteemed and able editor—Mr. Crosbie-Walsh. We have been both subscribers and advertisers since the first issue of FOOD MANUFACTURE. It is not always a fact that new trade journals are welcomed by the trade; nevertheless there was 25 years ago a real need for a journal of the nature which you conceived; and that FOOD MANUFACTURE has fulfilled this need adequately is evidenced by its steady growth throughout these 25 years. Such is the wide range of the subjects dealt with and such is their authenticity that we find we use FOOD MANUFACTURE constantly and bound volumes from the first number find a place in our Technical Library. We conclude by wishing you continued success in your service to the food industry.—*W. J. Bush & Co., Ltd.*

We send you our sincere greetings for the future. FOOD MANUFACTURE has developed into a journal which is eagerly anticipated by all subscribers. May you continue to serve the food industry in the future as well as you have done during the last 25 years.—*Caleb Duckworth, Ltd.*

May we take this opportunity of sending you our best wishes on the occasion of the 25th anniversary of FOOD MANUFACTURE. We in this company have a very healthy regard for the value of the technical trade press and you may rely upon our co-operation at all times in any way possible.—*George Clark & Son, Ltd.*

Best wishes to FOOD MANUFACTURE on its 25th anniversary. Having known, read, and recommended it for years, we are convinced of its value as a source of reliable up-to-date trade information. FOOD MANUFACTURE is indeed a fine example of technical journalism at its best and as such, your journal has gained and maintained the confidence of both readers and advertisers. With FOOD MANUFACTURE's record of achievement, it can certainly look forward to a bright future.—*Clarke-Built, Limited.*

We welcome the oppbrtunity of sending you our congratulations on the occasion of the 25th anniversary of FOOD MANUFACTURE. As advertisers in your pages, the quality and extent of your readership, both at home and abroad has been convincingly demonstrated to us, and we wish you continuing success for your publication.—*Cooper McDougall & Robertson, Ltd.*

It is with great pleasure we pen these few words of congratulations to you on attaining your 25th anniversary. You have earned the sincere appreciation of all your readers with the very excellent standards of service which you offer through FOOD MANUFACTURE. We look forward with great anticipation and confidence to your future editions.—*The Creamery Package Mfg. Company, Ltd.*

On the occasion of your 25th anniversary we would like to express our appreciation as electrical manufacturers of the service you give in bringing to the notice of your readers the latest developments in electrical equipment, particularly lighting, that will help food manufacturers to achieve greater productivity and maintain hygienic standards. For our part we find your journal interesting in that it keeps us informed as to developments in food manufacturing processes and equipment and gives us the knowledge we require to develop special equipment for the food industry.—*Crompton Parkinson, Limited.*

It is with particular pleasure that we associate ourselves with your many friends in the trade in congratulating you on your 25th anniversary. FOOD MANUFACTURE is acknowledged to be of outstanding value to all food producers and suppliers. We have found it to be of inestimable and ready assistance to us, particularly the Enquiry Service which we note is always fully utilised by the trade. We take this opportunity of wishing you continued success in the important function that you fulfil.—*S. Daniels and Company, Limited.*

We have advertised in your journal for many years and found it an extremely useful medium. Moreover, it always seems to keep up-to-date and is interesting. We should like to wish you continued success.—*Dawson Bros., Limited.*

Heartiest congratulations on the 25th anniversary of your excellent journal.—*The Distillers Company, Ltd.*

As a small, but regular, advertiser in your journal, we should like to say that we congratulate all concerned with the production of FOOD MANUFACTURE in the celebration of its 25th anniversary and hope that it will continue to benefit the trade for many, many years.—*Alfred Eva & Son, Limited.*

We should like to congratulate FOOD MANUFACTURE on reaching its 25th anniversary. We have here every copy of FOOD MANUFACTURE from Vol. I, No. 1. to the present day, and find the volumes of constant interest and use. May we say that we very much admire your ability to continue to interest a very varied readership, including not only food technologists, but engineers, accountants, and administrative staff? We believe that your journal has helped to no small extent to build up a better understanding between the various specialists who together have taken up food manufacturing as a career. We wish the journal all the success it deserves in the future.—*William Evans & Co. (Hereford and Devon), Ltd.*

We congratulate you on the celebration of your 25th anniversary, and wish you continued success.—*Edward Fison, Ltd.*

We must congratulate you upon the issue of the jubilee number of FOOD MANUFACTURE, which is quite an interesting event and we trust that in 25 years' time you will see as many advances as the first 25 years have shown.—*Flexile Metal Co., Ltd.*

This Federation is glad to send its message of congratulation to FOOD MANUFACTURE upon attaining its silver jubilee.—*Glass Manufacturers' Federation.*

On the occasion of the publication of the silver jubilee number of FOOD MANUFACTURE we should like to state that we are very satisfied with the results our announcements have achieved in the journal, for the many enquiries we have received provide us with evidential support for our original belief, that FOOD MANUFACTURE would be read by the very many customers we have in the food manufacturing trades.—*Glazebrooks, Ltd.*

Whatever the changing values in these uncertain days, the inestimable value of experience is one which will never vary. Your publication is in the fortunate position of having 25 years of accumulated knowledge of the field in which it serves—a background of proud achievement. We are pleased to be associated with its progress and send our best wishes for many more years "leading the field."—*G.W.B. Electric Furnaces, Limited.*

During our business life, we have seen many trade periodicals come and go, but FOOD MANUFACTURE remains the foremost and of the greatest interest to the trade.—*T. Harrison and Co., Ltd.*

A 25th anniversary in the field of industry is no mean achievement. We congratulate FOOD MANUFACTURE on maintaining the production and efficient distribution of a journal conveying news, features, and information at the high standards required by their section of our industries.—*Henlys, Limited.*

Congratulations on your silver jubilee, and we hope your golden jubilee in 1977 will find us still advertising in your columns.—*Hilton, Wallace & Co., Ltd.*

We would like to take this opportunity of congratulating you on reaching, so successfully, your 25th anniversary and to wish you all the best for continued success in the future.—*Honeywell-Brown, Limited.*

We wish to send our congratulations on the 25th anniversary of FOOD MANUFACTURE.—*Horwood Catering Equipment, Ltd.*

Sincere congratulations and best wishes on reaching your 25th anniversary.—*Howards & Sons, Ltd.*

We would like very much to send a small message of greeting for your jubilee number.—*Industrial Tapes, Ltd.*

We would like to offer our heartiest congratulations on the occasion of the 25th anniversary of FOOD MANUFACTURE. We have been pleased to be associated with the journal for a good number of years, and we wish you continued success in the future.—*A. Johnson & Co. (London), Ltd.*

I suppose we are one of the earliest advertisers and readers not directly associated with the food trade, our main interest being the packaging of containers and label papers for the pack. We always consider your paper very well presented, very informative and helpful to us in keeping in touch with the food trade from our angle.—*Samuel Jones & Co., Ltd.*

We wish to associate ourselves with all the good wishes FOOD MANUFACTURE will receive for the success of the special jubilee number, and also to offer our sincere congratulations on 25 years' loyal and discriminating service to the industry.—*Kimpton Bros., Ltd.*

We should like to congratulate you on the attainment of your jubilee, and we trust the good work you are doing will be continued for a very long time. Your periodical has always been attractively produced and never fails to have something of interest for the industries for which you cater.—*Lax & Shaw, Limited.*

Many congratulations on the 25th anniversary of FOOD MANUFACTURE.—*Lintas Information Services, Limited.*

May we take this opportunity of congratulating you upon the 25th anniversary of your very excellent journal. As you are no doubt aware, we have utilised space in FOOD MANUFACTURE for a considerable number of years and we are quite sure that this has enabled us to make contacts and business friends in the food industry far quicker than other people. We like your journal and its standard of presentation and we certainly hope that during the next 25 years you will enjoy similar success.—*The Magnetic Valve Co., Limited.*

Over a number of years we have seen FOOD MANUFACTURE go from strength to strength. May the good work continue.—*Manesty Machines, Ltd.*

We should like to thank the editorial and advertisement staff of FOOD MANUFACTURE for their past assistance. Congratulations on the attainment of your 25th birthday.—*Margulies Bros., Ltd.*

Congratulations to FOOD MANUFACTURE on completing 25 years of service to the industry. In bringing readers up-to-the-minute information on activities within the industry, promoting higher standards of production, and disseminating technical information, FOOD MANUFACTURE is playing an essential rôle. May the next quarter of a century prove equally fruitful for this live journal.—*Marconi Instruments, Limited.*

We have found your admirable journal invaluable in keeping us abreast of progress, and your advertisement columns in making others aware of our own.—*The Metafiltration Co., Ltd.*

We should like to take this opportunity of congratulating you on having served the food industry so comprehensively with your publication during the last 25 years.—*Mono Containers, Ltd.*

We were interested to learn that FOOD MANUFACTURE will be celebrating its 25th anniversary this year. Since we understand FOOD MANUFACTURE was the first journal in the world to be published to cater for food manufacturers, Leonard Hill Limited must feel some gratification in the foresight which prompted its inception and be justly proud of an editorial policy which has kept in step with up-to-date developments throughout its 25 years.—*Mono Pumps, Limited.*

Many happy returns! We are pleased indeed to add our tribute to the shoal of congratulations you have surely received on the attainment of your 25th birthday. May you long continue to serve the best interests of the industry and go from strength to strength in your policy—which, incidentally, is one that we also have always pursued—of constantly striving for improvement in every aspect of the manufacture and marketing of food.—*Morning Foods, Ltd.*

Congratulations on your jubilee. Increased efficiency in the manufacture of food is of more importance now than ever before and you may count on our continued support.—*Paterson Hughes Engineering Company, Limited.*

We congratulate FOOD MANUFACTURE on its 25th anniversary. It is an excellent journal, and we wish it continued success.—*Geo. Pickles and Co.*

We note with great interest the celebration of your 25th anniversary. May we wish you further success and a doubling of circulation.—*Plenty and Son, Limited.*

We would very much like to offer our congratulations to you on the 25th anniversary of FOOD MANUFACTURE. It has been a very helpful and interesting journal in its own particular field and has been one of the factors in the progress we find in the food industry today. We wish you many years of prosperity and achievement.—*Pneumatic Scale Corporation, Ltd.*

We should like to tender our heartiest congratulations to FOOD MANUFACTURE on the celebration of its 25th anniversary, a distinction which we can well appreciate from our own recent silver jubilee. The journal, always so attractively presented and containing a wealth of knowledge in every issue, is read with interest by executives of the P. & S. Organisations throughout the world, and on several occasions we have been indebted to this periodical for a service which has assisted in our own advancement. We are quite certain that all concerns connected with the food industry appreciate that this really excellent journal is a medium through which flows a free exchange of knowledge and ideas, while its advertising facilities are too well known to require comment.—*Polak & Schwarz (England), Limited.*

May we congratulate you on the attainment f your 25th birthday. FOOD MANUFACTURE as certainly never looked back since its first ssue and we have heard from our customers all over the world that they value it very highly.—*The Premier Filterpress Co., Ltd.*

Trade journals perform a very valuable function, making available to their readers with every issue a variety of information and informed comment which it would be almost impossible to collect otherwise. The news of today is tomorrow's history and with 25 years of life behind it, FOOD MANUFACTURE must indeed have a wealth of history recorded in its pages. We are pleased to think that Prestcold Refrigeration has earned for itself some place in this very comprehensive record of today and yesterday. Congratulations and best wishes.—*Pressed Steel Company, Limited.*

Please accept our sincere congratulations on having reached the 25th anniversary of FOOD MANUFACTURE. We feel that you have deserved the success you have attained. Your journal is very attractively got up and the information it contains is distinctly up to date, written by experts, and well arranged. The print is easy to read and the illustrations are clear and enlightening. We are regular advertisers but apart from knowing that our advertisements have an influential readership, FOOD MANUFACTURE has, at times, indicated new and special applications for our products. —*The Pulsometer Engineering Company, Limited.*

With Mr. W. Leonard Hill as the founder of such a fine journal, the success of FOOD MANUFACTURE was assured, so we take this opportunity of sending our congratulations on its 25th anniversary. We have been associated with FOOD MANUFACTURE for many years and we know that with its high standard it will continue to serve and satisfy. —*Purdy Machinery Co., Ltd.*

We are young compared with FOOD MANUFACTURE but we have been advertisers with you ever since we introduced the Handy Andy warm air towel in 1949. We trust we shall still find your columns helpful to us when you are bringing out your centenary issue and we are youngsters of 77.—*Quiz Electrics, Ltd.*

We tender you our congratulations on the attainment of your 25th anniversary. We have always read FOOD MANUFACTURE with interest, and in our opinion it is extremely well turned out.—*Rayner & Co., Ltd.*

We congratulate FOOD MANUFACTURE on the occasion of its 25th anniversary number, and trust that the high standard achieved will be maintained.—*The Realm Engineering Works, Ltd.*

We congratulate you on reaching 25. It took us 100 years to knock up a century, 25 of them with our present proprietor. To your readers we say: "If you've a chemical or product, and nothing to put it into, try oak vats or casks. If oak won't do, we can supply vats in other timbers."—*David Roberts & Son.*

We wish your journal, which we have for a long time regarded as the most significant trade journal in our field, a successful course in the service of the food industry for the next 25 years as well. May peaceful developments in Europe contribute to the exchange of food products between our two countries. We look forward to the contribution of FOOD MANUFACTURE in this direction.—*Rola, G.M.B.H., Germany.*

May we offer our congratulations on this your 25th anniversary. Our association with your paper has only been of relatively short duration, but has been sufficient to indicate its usefulness as an advertising medium and we have been very pleased with the results obtained to date.—*Royles, Limited.*

We would like to take this opportunity of expressing our sincere good wishes and congratulations for your jubilee and at the same time would add, that your editorial and advertising services are greatly appreciated by us.—*Rozalex, Ltd.*

We send to you our good wishes for the next 25 years and would say that having advertised regularly in your journal since its inception and been regular readers, we have noted with interest and pleasure the continual improvement during the years. We have no doubt that during the coming years greater successes will be achieved.—*George Scott and Son (London), Limited.*

On the occasion of the silver jubilee of FOOD MANUFACTURE we send you congratulations and best wishes for a continued and prosperous career; at the same time we record our appreciation of your always ready cooperation. There can be no doubt of the value of reputable trade journals like FOOD MANUFACTURE not only to the trade they serve, but to manufacturers and distributors who also, for their part, try to serve trade in their way.—*Shell Chemicals, Limited.*

May we offer you our congratulations on editing your 25th anniversary of FOOD MANUFACTURE? We feel that FOOD MANUFACTURE is fulfilling a very useful purpose in the food manufacturing industry, and we trust that the next 25 years will see it progress from strength to strength. At the same time, we would like to convey our thanks for the help given to us in the introduction of the Silverson machine to the food trade, and we feel that we owe a large amount of the success which we have had to your valued journal.—*Silverson Machines (Sales), Limited.*

Please accept our sincere congratulations on reaching your 25th anniversary. As advertisers from the first issues, we have followed with interest the growth of FOOD MANUFACTURE to its present format which is a highly creditable achievement. The journal undoubtedly serves a most useful contribution to the food manufacturing and allied trades. Our best wishes for continued progress.—*Stevenson & Howell, Ltd.*

Congratulations on reaching your quarter century, on our behalf and that of our friends, Butterfields of Shipley, who have been batting on your pitch for many a year. Here in Yorkshire, compliments are noticeably free from froth (a friendly critic once observed that to get a really warm commendation from a Yorkshireman involves a major operation), so let's live up to our reputation and simply say that you have made the grade, holding your advertisers as a sound, well-produced journal should. We wish you well on the next stage of your journey, to the half century. —*Storey Evans & Co., Ltd.*

We have great pleasure in congratulating you on 25 years' successful publication of your journal. The sincerity of this statement is guaranteed by the fact that FOOD MANUFACTURE is on our regular reading list, and has always carried its share of our advertising. During these 25 years your journal has grown in size and usefulness, and has always maintained a very high standard of material and presentation. This period has seen great developments in the processing of food, and your journal has always been able to give its readers up-to-date and authoritative information in this field. May we hope that your enterprise will continue to prosper and that you will, in the future, maintain the high standard of service to the food industry which you have shown in the past.—*John & E. Sturge, Limited.*

Congratulations upon the 25th anniversary of FOOD MANUFACTURE. We look forward to the continuance of our very happy associations with your magazine.—*Teleflex Products, Ltd.*

Congratulations on your 25th anniversary and thank you for introducing to us so many friends through our advertisements in FOOD MANUFACTURE.—*D. Trapow & Co., Limited.*

Congratulations to FOOD MANUFACTURE from the makers of Fumite smoke insecticides. In the course of its 25 years this valuable journal has brought many developments to the notice of the industry.—*Waeco, Ltd.*

During the past 25 years you have assisted, both by a sympathetic attitude and by the dissemination of information, many important changes in the type of equipment used in the food manufacturing industries. As both readers and advertisers we take pleasure in congratulating FOOD MANUFACTURE on its jubilee and may it long continue its good work in improving standards in the industry. —*Warwick Production Company, Limited.*

We would like to congratulate you on the celebration of your 25th anniversary and on the good work which you have done for the food industry generally.—*White, Tompkins & Courage, Ltd.*

The following kind greetings have also been received:

Hearty congratulations to you on your 25th anniversary issue. All of us engaged in the canning industry owe a considerable debt to the food trade Press of which your magazine is a most valuable member.—*Lt.-Col. Maurice W. Batchelor (Batchelors Peas Ltd.).*

I am happy to offer FOOD MANUFACTURE my congratulations on the 25th anniversary of its first issue, especially as I have been for well over 50 years closely associated with the canning of foods as a manufacturer of lacquer. I recall those early days before the food industry had developed to the extent when the publication of a journal devoted to food manufacture was highly essential.—*A. Ll. Matthison (Arthur Holden & Sons, Ltd.).*

I should like to add my congratulations to the many others received. FOOD MANUFACTURE appeals to me because it provides a monthly survey of what is taking place in the food industry.—*Thomas McLachlan.*

Congratulations on your jubilee. Your magazine has become essential to all executives in the food manufacturing industry. In these difficult times your presentation of scientific and technological information has been the greatest help to the industry by showing how production and efficiency can be increased.—*S. A. Lancaster (Procea Products Ltd.).*

Congratulations on your 25th birthday! The food industry and all associated with it owe a debt to FOOD MANUFACTURE for the painstaking manner in which, for the past quarter of a century, it has continued to spread vital knowledge in an attractive, informative manner. Long may you continue your efforts in the industry's common cause.—*Sir Graham Cunningham, K.B.E. (Triplex group of companies and Quickfit & Quartz, Ltd.).*

I remember that when your first number came out Wall's had been making ice cream for only five years and the "Stop Me and Buy One" tricycle fleet was just beginning to spread throughout Britain. I feel, therefore, that you and the ice cream side of our business have, in a sense, grown up together, and it gives me great pleasure to send a message of congratulations to you on your 25th birthday. We have been making sausages since the days of George III in 1786. It is my hope that an equally long and prosperous future lies before FOOD MANUFACTURE and to that effect I send my best wishes to the editor and his staff.—*Cecil W. Rodd (T. Wall & Sons, Ltd.).*

Standards for Jam and Marmalade

The Food Standards (Preserves) Order, 1944, S.R. & O. No. 842, as amended, prescribes standards for fresh fruit standard jam and marmalade; full fruit standard jam and marmalade; and special standard marmalade, specifying the minimum fruit or vegetable content and the minimum soluble solids content. It also provides for standards for mincemeat and fruit curd. The Food Standards Committee's recommendations in this Report relate only to the provisions covering jam and marmalade.

THERE have been a number of discussions with the industry and certain trade users on the question of standards for jam and marmalade, and the following is a summary of the evidence given by the industry and the proposals submitted by them, together with the conclusions and recommendations of the Food Standards Committee.

Need for a Standard.—The industry and the Committee are both agreed that for the protection of the consumer it is desirable that statutory standards shall continue to be laid down for jam and marmalade. The Committee also say that the standards should apply to both home-produced and imported jam and marmalade, and not merely to home-produced jam and marmalade as at present.

Minimum fruit content for short and long term standards.—Table 1 shows the standards suggested by the industry.

The Committee are firmly convinced that in the long term, the minimum fruit contents should approximate closely to the pre-war full fruit and fresh fruit "standards" (see last column of Table 1). They recognise, however, that these figures cannot be fully achieved in present economic conditions. Any appreciable increase in fruit content would probably raise prices of jam beyond the reach of many consumers.

On the other hand, the Committee feel that the minimum fruit contents proposed by the industry for blackcurrant, raspberry, loganberry, and certain mixtures are too low, and that even in present conditions a minimum fruit content of 30 per cent. should be the target.

Subject to these views, the Committee accept the following explanations offered by the industry in the under-mentioned items:

In the case of damson jam, it was agreed between the Food Manufacturers' Federation and the Society of Public Analysts before the war that a fruit content of 35 per cent. made the best quality jam; a higher fruit content produces a less satisfactory product.

Experience has proved that a fruit content of 38 per cent. produces the best bramble jelly jam.

Gooseberries are much more expensive than before the war, and a content higher than 30 per cent. would make the jam practically unsaleable.

The best strawberry jam is made with 42 per cent. of plugged strawberries. Shortage of farm labour is, however, an important factor, and it is recommended that the minimum standard should be retained at 37½ per cent. at present, apart from rounding up the figure to 38 per cent.

Samples of strawberry, raspberry, and blackcurrant jams specially prepared by a manufacturer were submitted to the analyst members and to the Ministry of Food Taste Panel. In the light of the results of these tests and of the considerations mentioned above, the Committee recommend that the minimum fruit contents shown in Table 2 shall be prescribed as short term proposals.

TABLE 1

Minimum fruit content for 100 lb. of jam

	Short term	*Long term (as and when conditions permit)*	*Pre-war full fruit standard and fresh fruit standard of the Food Manufacturers' Federation*
	lb.	*lb.*	*lb.**
Bramble	38	38	38
Blackcurrant	22	25	30
Cherry	40	40	45
Damson	35	35	38
Gooseberry	30	35	35
Gooseberry and raspberry	30	35	—
Gooseberry and strawberry	30	35	—
Greengage	38	38	40
Loganberry	25	30	38
Raspberry	25	30	38
Raspberry and gooseberry	30	35	40
Raspberry and loganberry	25	30	—
Raspberry and redcurrant	30	35	40
Redcurrant	35	35	35
Rhubarb	40	40	45
Strawberry	37½	42	42
Strawberry and gooseberry	35	35	40
Youngberry	38	38	—
All other varieties	40	40	40

* These figures are inserted for comparative purposes.

The short term proposals have regard to present economic and supply conditions.

Soluble Solids Content.—The industry suggest that the minimum soluble solids content of all jam and marmalade shall remain at 68½ per cent. pending the result of tests which are being conducted by the British Food Manufacturing Industries Research Association.

It is the Committee's suggestion that it might be appropriate to prescribe two standards for the soluble solids content of jam and marmalade, *viz.* a minimum of 68½ per cent. for jam in ordinary containers and a minimum of 65 per cent. for jam in hermetically

TABLE 2

	Minimum fruit content per 100 lb. of jam Short term lb.
Bramble	38
Blackcurrant	30
Damson	35
Gooseberry	30
Gooseberry and raspberry	30
Gooseberry and strawberry	30
Greengage	38
Loganberry	30
Raspberry	30
Raspberry and gooseberry	30
Raspberry and loganberry	30
Raspberry and redcurrant	30
Redcurrant	35
Strawberry	38
Strawberry and gooseberry	35
Youngberry	38
All other varieties	40

sealed containers. The Committee accept these figures for a trial period of not less than two years.

Standards for jam made from fresh fruit and pulp.—The industry interpret the existing Preserves Standards Order as permitting the use of pectin in fresh fruit jam. As pectin contains sulphur dioxide there would be difficulty in distinguishing analytically between jam made from fresh fruit and jam made from pulp preserved with sulphur dioxide. There would accordingly not be much point in having separate standards for these two types; analyses would not readily distinguish the two products. The industry's interpretation of fresh fruit, with which the Committee agree, is "fruit which has not been preserved with chemical preservative," and they consider that the onus of justifying a claim for the making of fresh fruit jam should rest with the manufacturer of the jam, who should be able to do so from his records of usage of fresh fruit.

Use of Pectin.—The view of the industry that it is unnecessary to limit the amount of pectin used is also agreed with by the Committee. On account of the cost, no manufacturer would use more pectin than is absolutely necessary to replace any deficiency in the pectin content of the fruit and to attain the desired jelling properties.

Use of Acids.—It is the view of the industry that the selection of acids should be left to their discretion, subject to the general provisions relating to foodstuffs. Citric acid is the one in general use in jam making, tartaric acid is occasionally used, and the industry think that there is no reason why malic acid should not also be used is desired.

The Committee agree that the acids should be restricted to citric, tartaric, and malic.

Colouring Matter and Preservatives.—The industry have expressed the view that the addition of colouring matter to jam is adequately covered by the existing Food and Drugs Act and the Public Health (Preservatives, etc., in Food) Regulations. Colouring matter is not used to any great extent, and the amount needed varies from batch to batch according to the type and condition of the fruit. Preservative is not added to jam, but sulphur dioxide is present in certain pulps; it may also be present in sugar and traces may remain after boiling. The Preservatives Sub-Committee are examining both preservatives and colouring matters in foods generally, and the Committee consider that it would be premature to make a specific recommendation in regard to preservatives, etc., in jam and marmalade until the Sub-Committee have published their report.

Vegetables.—The industry are anxious that the adulteration of jam and marmalade by vegetables should be prohibited, and they contend that the wording of the existing Standards Order gives the impression that vegetables, such as turnips, may be used in jam. They suggest that only rhubarb, ginger, and marrow should be regarded as fruit for the purposes of a Standards Order and that the word "vegetables" should be omitted from any schedule of minimum fruit content.

The Committee agreed that the term "vegetables" should not be used in the revised standards, and recommended that marrow, ginger, and rhubarb should be classed as fruits for this purpose.

Mixed fruit jam.—In the case of mixed jams, the industry's proposal that the first-named fruit shall amount to not less than 50 per cent. and not more than 75 per cent. of the total fruit content, was accepted by the Committee.

Definition of "Prepared Fruit."—The following definition for "Prepared Fruit" has been suggested by the industry:

> (*a*) "Prepared Fruit" is fruit, whether sieved or not, from which the stalks and calices have been removed.
> (*b*) Where seeds and stones are also removed, as in the case of seedless or stoneless jams and fruit jellies, "Prepared Fruit" shall be defined as in (*a*) above, *i.e.* before removal of such seeds and stones.

The Committee recommend that the suggested definition of "Prepared Fruit" be accepted, and that it shall apply equally to seedless and stoneless jam. As a result, the weight of the seeds and stones will be included in the weight of the prepared fruit. For the purpose of the above definition, trimmed rhubarb and marrow without seeds, stem, or rind shall be regarded as "Prepared Fruit."

Labelling.—The industry feel that it is well-nigh impossible to standardise the production of jam and marmalade; there must of necessity be wide variations in the quality of different types. They deprecate, therefore, the compulsory use of the word "Standard" on labels because this may lead a purchaser to think that all products so labelled are guaranteed to be exactly the same. They also see no necessity for the declaration on the label of the ingredients of jam including colouring and preservatives. They consider it important that a purchaser shall know the name of the manufacturer of the product purchased. In the opinion of the industry the name of the manufacturer of the product should be clearly stated on the label and/or cap, even if the distributor also desires to add his own name.

The Committee think it unnecessary to make any recommendation about the disclosure of ingredients on the label, and they understand that the industry's suggestion that the manufacturer's name should appear on the label has been decided administratively.

Diabetic Jam and Marmalade.—The industry's proposal that the minimum standards shall not

apply to diabetic jam and marmalade labelled as such, was agreed to by the Committee.

Marmalade.—The industry suggest the following definition for marmalade: "A preserve containing not less than 68½ per cent. of soluble solids made from citrus fruit of which not less than 20 lb. of citrus fruit has been used for 100 lb. of marmalade."

The Committee accept the industry's proposal for a minimum citrus fruit content of 20 per cent. for marmalade.

Ginger Marmalade.—The Committee are also in agreement with the industry's recommendation that the definition of ginger marmalade shall be "a preserve containing not less than 68½ per cent. of soluble solids, the total fruit content to be not less than 25 lb. of citrus fruit and/or drained ginger per 100 lb. of marmalade of which not less than 15 lb. must be drained ginger."

"Where ginger normally imported in syrup is used, the minimum amount of ginger shall be ginger from which the syrup has been drained for 10 minutes through a ¼ in. or appropriate sieve."

Bakery Science and Technology

ONLY time will show whether a recent book* on baking is a gallant failure or a great success. The authors firmly believe that a proper study of baking technology cannot even begin without knowledge of fundamental science, a general principle with which members of many other industries will agree. With this conviction, the authors have set out to solve, in a single volume, the total educational problem involved.

This is not, therefore, merely a technical book on baking. The first 92 pages of the text deal solely with scientific principles of physics and of chemistry. Some 20 following pages then show the application of these principles to the materials and conditions of baking. It might be said that the book proper does not start until page 119, when the authors leave general science and plunge into baking as an applied science.

Let it be said that all this is very well done. The excellence of the 300 or so technological pages can indeed be assumed from the reputations of the authors. The presentation of physics and chemistry in Part I is achieved as well as could be expected *in 118 pages*. That raises the question—can we really make these shortcuts into technology, substituting a sort of crammer's course in selected aspects of science for the several years of youthful scientific education that should form the true entrance?

This reviewer is exceedingly dubious. To him, indeed, the dangers of partially digested science seem as great as those of ignorance. To such doubts the authors can rightly reply: "Is nothing to be done then? Is it to be assumed that technological education cannot begin until years of general scientific preparation have provided fully equipped students?"

If courage and excellent intentions are enough, their book will certainly accomplish its task. Moreover, it could be a model for other technological books where the same educational Mount Everest has to be tackled. Whether the summit can in fact be reached in this way is doubtful, but there can be only praise for the authors for making the finest possible attempt.

For the reader with considerable knowledge of basic science, the book will be a "natural." For such a reader, Part I will be a useful refresher course and the rest a joy of smooth assimilation. Since the ideal technological student has received a preliminary scientific training, this can be regarded as the ideal text-book and subsequent hand-book on the technology of bakery. Occasional revisions should give it long life as a standard and authoritative book. The authors have gone to great pains in covering thoroughly every scientific aspect of practical baking, not omitting such subjects as pest infestation and control and the use of modern detergents in cleaning plant and premises.

Will the book fulfil the hopes of Prof. Todd and Dr. Coppock in their two short forewords? Prof. Todd has found that bakers and bakery students are reluctant to accept science as a proper component of a good bakery course; Dr. Coppock opines that the value of a Research Association depends on the number of bakers with scientific knowledge being sufficient to take advantage of the benefits of research. It will not be the authors' fault if their book does not go a long way towards solving these problems.—D. P. H.

* *The Science, Raw Materials, and Hygiene of Baking.* By Alexander Urie, B.Sc., Ph.D., F.R.I.C., A.R.T.C., and J. H. Hulse, B.Sc.(Tech.). Pp. 458+ xxviii. Macdonald and Evans. Price 30s. net.

New Books Register

Orders for any of the books listed below, or scientific and technical books in any language, may be placed with the Books Department, FOOD MANUFACTURE, *17, Stratford Place, London, W.1. A selected stock of books is carried and may be inspected at the above address. Prices given do not include postage.*

McMeekan, C. P. *Pig Production, Breeding and Management.* Whitcombe and Tombs. Pp. 172. 49 illustrations. 10s. 6d.

Maynard, L. A. *Animal Nutrition.* New 3rd Edition. McGraw-Hill. Pp. 474. Illustrated. 55s. 6d.

Zirkle, R. E. *Biological Effects of External Beta Radiation.* National Nuclear Energy Series. McGraw-Hill. Pp. 242. Illustrated. 28s.

Jacobs, M. B. *The Chemistry and Technology of Food Products,* Vol. III. 2nd revised edition. Interscience. Pp. 808. £6.

Langenbach, A. *The Wines of Germany.* Harper and Co. Pp. 168. 50 illustrations. 21s.

Middleton, A. R., and Willard, J. W. *Semi-micro Qualitative Analysis.* Allen and Unwin. Pp. 446. 23 tables. 30s.

News from the Industry

FORTHCOMING EVENTS

Society of Public Analysts

A summer meeting of the North of England Section of the Society of Public Analysts and Other Analytical Chemists will be held at the Imperial Hotel, Llandudno, from Friday, June 13, to Monday, June 16. A paper entitled "The Analyst in the Plastics Industry" will be given at 10.30 a.m. on June 14 by D. J. Haslam, F.R.I.C., of I.C.I. Plastics Division.

*

Royal Sanitary Institute

The following sessional meetings are included among those arranged by the Royal Sanitary Institute:

Portstewart (Northern Ireland) Sessional Meeting, June 7, at 10.15 a.m. in the Town Hall, Portstewart. Papers on "A Review of Meat Inspection Practice in Northern Ireland," by A. M. Logue, County Sanitary Officer, Co. Londonderry; "Food Handling," by Dr. Percival V. Pritchard, County Medical Officer, Co. Antrim; and "B.C.G. Vaccination," by Dr. J. N. Whyte, Physician, Northern Ireland Tuberculosis Authority.

London Sessional Meeting, June 11, at 2.30 p.m. at the Institute. Paper on "The Incidence of Mycobacterium Tuberculosis in Various Types of Raw and Heated Milk with Observations on the Control of the H.T.S.T. Process," by J. G. Davis, Ph.D., F.R.I.C., Express Dairy Co.

Pig Carcass Grading

Speaking at the presentation of prizes for the fifth B.O.C.M. National Pig Litter Tests, Mr. Collan E. B. Brett, bacon production manager of T. Wall and Sons, said that carcass grading was vital to a healthy pig industry.

The purpose of carcass grading in a free market was to give producers a price for their pigs related to their value to the provision trade. In other words, they would be rewarded for breeding and feeding skill and encouraged to continue developing these to meet popular demand and benefit the consumer.

Mr. Brett thought that sides of bacon should carry a grading mark right to the retailer's counter. This might take the form of a coloured line, running across, and so branding the rind of every rasher. Special strip-branding would convey the grading information all the way from factory to dining-room.

Dismantling the Skylon

The Skylon, famous feature of the South Bank Exhibition, is to be dismantled by George Cohen, Sons and Co. It will yield about 30 tons of metal.

The Hermic 6 packing and filling machine for use with lined cartons.

Automatic Machine for Lined Pack

Arrangements are being made to manufacture in Great Britain an automatic packing machine to meet the requirements of the specially constructed Hermetet lined carton, now being produced by The Paper Goods Manufacturing Co., a subsidiary of I.C.I. The carton lining material, which is folded and sealed by the closing flap of the carton, making the pack sift-proof, can be varied according to the texture of the product. Certain heat-sealing liners can be used to resist water vapour, grease, oil, and alkalis, and each carton has a specially designed end flap to form a pouring spout.

Designed in Sweden, and shortly to be marketed in this country and abroad, the Hermic 6 packing and filling machine for use with lined cartons, has an output of from 26 to 32 cartons a minute, depending on the product being packed. The flat cartons are fed into the machine automatically from a magazine holding up to 800 cartons, and pass through 12 stations on a revolving table of approximately three feet in diameter. The cartons are delivered from the magazine, squared up, and passed into the revolving table. The bottom closure is then folded, the liner closure is heat-sealed, and the carton closure is glued. After the final flap has been folded, the pack is filled and checked, and the four operations for sealing and closing the bottom are reversed and repeated for the closure of the top. The filled cartons are passed between heated platens to the delivery belts which hold the closures under pressure until set.

In addition to an automatic weigher, each machine includes trip switches to search out badly folded or damaged cartons, thermostatic control of all heaters, and totally enclosed visual glue feeds. The drives enclosed in the base of the machine are easily accessible through removable doors, and all electrical equipment and controls are housed in a desk type control cabinet with indicator lamps for each section of the machine. A dust extraction unit may be attached for use with certain products, and the change over to a completely new size of carton can be effected in 30 minutes.

International Commerce

The 70th annual report of the London Chamber of Commerce illustrates the Chamber's close concern with a wide range of matters affecting commerce. The work of the Chamber's sections covered such diverse subjects as German competition; trade with China; smuggling of watches; bills of lading; distribution of tea; activities of the Royal Mint; and contracts with Russia.

The Statistics and Enquiries Department lists some of the unusual enquiries received during the year. These include requests for manufacturers of Hindu sacred oil, suppliers of sheep's milk whey, importers of water fleas, and a request for the make-up or layout of a warehouse warrant.

Food and Plant Developments

SOME ACHIEVEMENTS SINCE 1927

During the last 25 years the food canning industry has made great advances throughout the world. Despite the shortages of raw materials, The Premier Filterpress Co. have greatly expanded their export trade and have also produced the first really high-speed double-seaming machine ever to be made in this country; previously this type of plant had been produced only in America and in one or two countries on the Continent.

*

In the field of citric acid manufacture, there have been many developments in the last quarter century. Twenty-five years ago this country was dependent for its citric acid on imported citrate of lime and concentrated citrus juices chiefly from the Mediterranean. A few years later the first fermentation process for the production of citric acid from sugar was developed in this country by John and E. Sturge. Now, Britain not only exports citric acid, but also citrate of lime made entirely from home-produced raw materials.

*

The production of high vacuum band driers was first undertaken by George Scott and Son (London) about 1924, but since that time there have been vast improvements in capacity and detailed design. Many of these driers are in operation both in this country and abroad on a wide variety of materials, including malt extract and several varieties of food products and beverages.

Just over 20 years ago stainless steel was coming on to the market as a suitable medium for chemical plant construction and although the earlier plants were generally of copper construction with stainless steel tubes, it was not long before the improvement in stainless steel and the experience gained in welding technique in the company's works enabled them to make complete plants, in particular, evaporators for milk and milk products with all the contact parts in stainless steel.

This led to a great improvement in the hygienic design of foodstuffs plant and by 1934 Scott's were among the earlier manufacturers of complete milk evaporators in stainless steel. They have pioneered hygienic design in this type of unit with the result that their modern forced circulation thermo-compression evaporator for milk and foodstuffs is in the forefront of recognised practice today.

Rather later, spray driers for milk powder were being constructed with the shells in stainless steel; some of the largest units ever installed for the production of milk powder were put into operation in the early 1940's.

The most marked improvement in process plant for foodstuffs during the last 25 years has, so far as this company is concerned, been the increase in size of units, the use of stainless steel for contact, and the great care that has been taken to achieve hygienic operation.

*

The extractors manufactured by Thomas Broadbent and Son have been connected with the food industry for over three-quarters of a century, their records proving that the centrifugal process was successfully applied to the treatment of meat in Australia and New Zealand long before 1900.

A comprehensive range of centrifugals is necessary for the production of modern foods, and to ensure that they are prepared economically and hygienically. The varying processes call for special materials and designs, and the application of corrosion resisting metals ensures that the prepared food retains its original flavour and purity.

The progress of extractor design has resulted in the production of vibrationless, easily controlled, extremely efficient machines which, although running at high speeds, are perfectly safe to operate. Direct coupled motors have reduced foundation areas, new welding and dynamic balancing techniques ensure greater basket strength and smoother running, and the introduction of automatic time clock controls ensures uniform moisture content.

The extraction process has been successfully applied to numerous methods of food production, among which are dehydration of potatoes, preparation of potato crisps, production of meat extract, separation of surplus fats from greaves and bones, extraction of coffee essence, recovery of beer from settlings, and the refining of sugar.

The company have also developed, in collaboration with the British Sugar Corporation, a new high duty sugar centrifugal, which is producing record throughputs in Australia and Holland. The use of finger-tip controls, automatic process timing, quick massecuite feed, and rapid automatic discharge guarantee high production and superior quality. No less than 67 Broadbent machines are to be installed in Europe's largest sugar factory and refinery at Puttershoek, Holland.

Great attention has been paid to improved working conditions and the installation of modern production methods during the post-war period. In addition to the special machines for the food industry, they produce equipment for the laundry and dry cleaning industries. The progressive policy of keeping ahead of the centrifugal and extractor market by increasing research and the use of modern equipment and design is proving successful.

U.S. Contract for U.K. Firm

The U.S. Department of Interior's Bureau of Reclamation has awarded a contract to the English Electric Company to construct a fourth large transformer for the Folsom Power Plant switchyard on the Central Valley Project in California. It will be the first non-American equipment to go into the big hydroelectric project.

The dam and power plant on the American River near Sacramento will, when completed, provide more than 160,000 kilowatts of vitally needed hydroelectric power capacity for domestic, municipal, industrial, and defence plant use in the region.

Paint for Food Factories

Disorganisation of work when the re-painting of walls becomes necessary has been eliminated with the introduction of Permoglaze emulsion coating, which is particularly useful in food factories. It is easy to apply, needs no primer or undercoat, can be applied direct to absorbent surfaces, such as bare or distempered brick, plaster, or cement, dries in one hour, and leaves no odour.

The hard satin (or eggshell) finish it gives is washable and scratch-resisting and the coating provides a deterrent to the formation of mould.

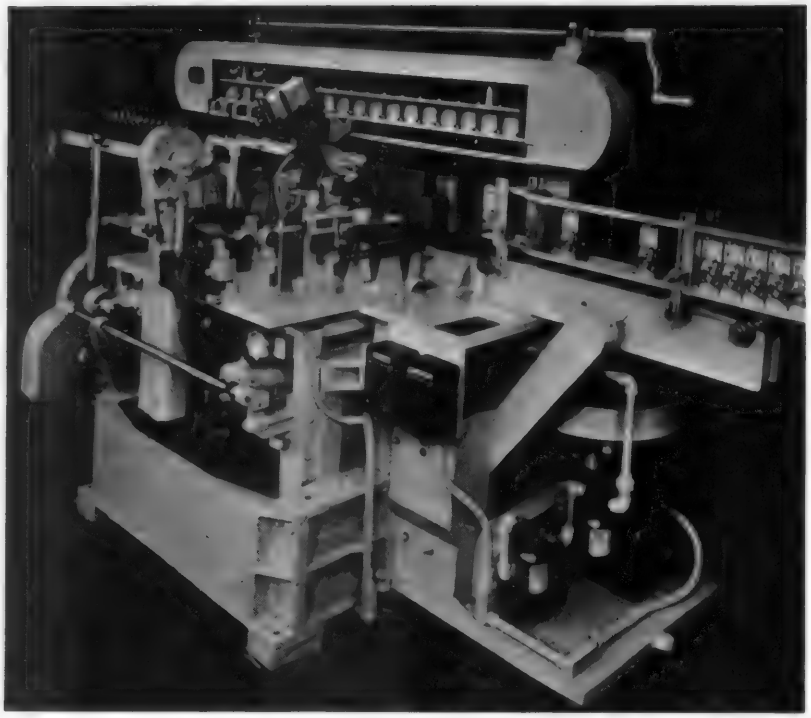
Waste Paper Recovery

The annual report of the Waste Paper Recovery Association shows that the target of one million tons was exceeded in 1951, the final total of 1,078,138 tons being 204,000 tons better than the best year of the war, 1942.

Recovery is now at a level above mill requirements and, as storage of waste paper beyond certain limits of tonnage already reached is difficult, it is desirable that collections should not be further expanded, but regulated to the known current requirements of the mills.

Film Strip on Bread

Intended mainly for educational purposes, a film strip, produced by Educational Productions in collaboration with H. W. Nevill Ltd., deals with the production of flour from the sowing of the grain to the milling of the wheat and the manufacturing processes used in the production of bread.



The Direc-Transfer labelling equipment.

Direct-transfer Labelling

A recent introduction to the company's wide range of packing machines is Pneumatic's Direc-Transfer labelling equipment, which has continuous straight-through intakes for the transfer of glassware from the conveyor, the containers being held in positive control through the entire labelling process.

The labelling unit of the 6 in. Simplex Direc-Transfer machine consists of a three-station indexing turret, mounted on which are three suction pads which serve to pack the labels from the bottom of the label stack. As the turret rotates counter-clockwise, the label surface comes into contact with a glue transfer roller which applies a thin uniform coating of adhesive.

Sufficient time is allowed for "tempering" the label as it travels to the second station, and as the final position is reached, the label is transferred directly, through contact, to the surface of the bottle.

Canteen Equipment

A combination unit comprising warming cupboard, fish frier, *bain marie*, and steaming oven, suitable for use in canteens catering for up to 75 persons, is now being marketed by Horwood Catering Equipment. This will be of considerable interest where limited kitchen space is available, in view of the fact that the overall dimension of the unit is 39 ft. × 24 ft. × 60 in.; alternatively each item can be purchased separately.

The Story of Margarine

A film dramatising the invention of margarine depicts the birth of a new industry arising from the activities of the Van den Bergh and Jurgens families 80 years ago up to the present time.

Entitled "A Story of Achievement," the film opens in 1867 at a time when Napoleon III was offering a prize for the invention of an alternative to butter. It shows the work carried out by the French scientist Mège Mouriés, who developed a mixture of suet, milk, and water into something approaching butterfat, and traces the difficulties with which the Van den Burghs and the Jurgens had to contend in the early days.

In this country today, margarine is a staple product for both domestic and manufacturing consumption. The original pioneering companies are still represented in the present firm of Van den Bergh and Jurgens, who concentrate on margarine for household use.

In the manufacturing field, The Craigmillar Creamery Co., a founder company of the present Craigmillar and British Creameries, were the first to make margarine in Scotland; they pioneered bakery margarines in particular.

Canning Problems

Improved deliveries of round cans to Scottish canning and packing firms have helped to stem any further decline in the output of canned goods, but the changed situation with regard to the Australasian market is causing some worry. Scottish canners did a considerable trade with Australia, especially in Scottish specialities.

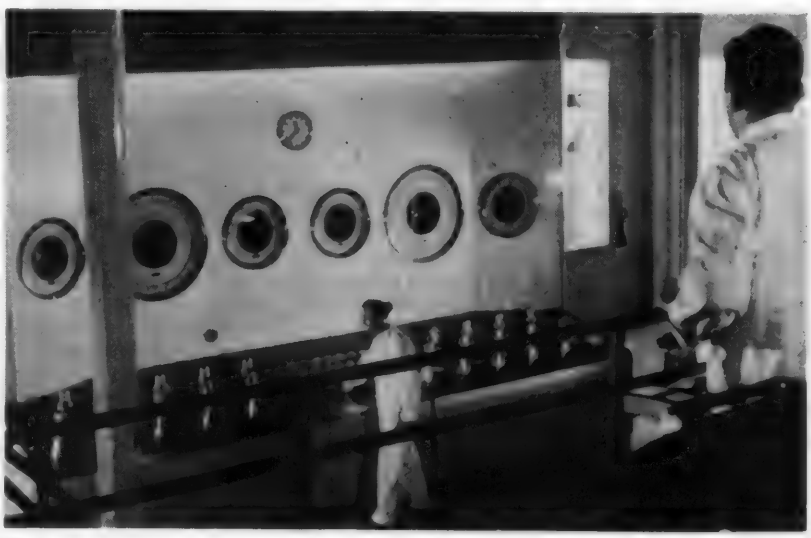
Meanwhile British packers have been offered German tinplate at a price which would have worked out at 4s. per dozen cans more than paid to producers in the U.K. Although Northern Ireland is buying such cans, the majority of British producers are believed to have turned them down in order to keep selling prices as low as possible in the public interest.

OBITUARY

John D. George, only son of the late Mr. W. J. George, a director of W. and J. George and Becker, at the age of 25 years.

*

Burleigh W. Fincken, chairman of Dryfood Ltd., on April 4, 1952.



The array of automatic levers used in the control of the blend of ingredients for margarine manufacture.

APPOINTMENTS

At a recent meeting of the Agriculture Group of the Society of Chemical Industry, Mr. W. Leonard Hill, chairman of Leonard Hill, Ltd., was unanimously elected chairman of the Group for the year 1952-53. Sir Harold Tempany, this year's chairman and editor of *World Crops*, was elected Hon. Recorder.

*

Mr. F. G. Grigg has been appointed representative of The British Hydrological Corporation for the south western area and south Wales.

*

Mr. Charles Lein of the Goodyear Tyre and Rubber Co. (Great Britain) has been elected chairman of the Institute of Packaging.

*

Mr. Norman E. Goddard, who has occupied an executive post with the company for 18 years, has been appointed to the Board of Foster Clark.

Versatile Drying Plant

Twin cylinder drying machines are used in the manufacture of a wide variety of food products. In the laboratory of Bertrams Ltd., a pilot plant is kept busy testing various products to ascertain whether these are suitable for drying, and whether the process would be commercially practicable.

Such machines are used extensively in creameries and for drying surplus milk. They are employed by chocolate manufacturers and in the manufacture of proprietary baby foods, also for yeast products.

Bananas are dried on them and they are used in the manufacture of meat extracts, and breakfast cereals.

These versatile machines also find a place in the chemical industry, where they are used in the manufacture of many chemical compounds, colours, medicinal salts, starch, soap powders, and aniline dyes.

Made in five different sizes designed to handle from 10 to 300 gallons per hour, the driers can be arranged in double, triple, or quadruple batteries with common cross conveyor, elevator, and sifter, these being driven independently.

Closure Manufacturers' Association

In his report made at the annual general meeting of the British Closure Manufacturers' Association, Mr. John Ryan, M.C., M.A., B.Sc., said that so far as supplies of tinplate were concerned, manufacturers were within measurable distance of some alleviation of the present position. In his review of the past year, he mentioned the substantial increases in costs that had occurred, one reason for which was the rise in the price of steel.

A dough room floor of Stelcon anchor steel plates.
Photo The Coombe Bakery (Teddington), Ltd.

Seen at the B.I.F.

A totally enclosed slip ring motor (prototype) and the Newphase electric motor for Star Delta starting on a single phase supply, two of the company's newest developments, were exhibited by Newman Industries.

*

Standard products, extruded from P.V.C. and polythene, were exhibited by Tenaplas, together with a range of new items. These included a cover for copper wire made from multi-coloured P.V.C., the company's method of covering rods and tubes with extruded P.V.C. tubing, and polythene tubing which was of particular interest to farmers wishing to lay a water supply to outlying buildings or any part of his land.

*

Stainless steel in various forms such as sheets, strip, bars, tubes, sections, wire, and castings, together with specimens of fabricated sheet metal work in stainless steel and samples of component parts were featured by Padley and Venables.

*

A comprehensive selection of instruments was exhibited by the Baldwin Instrument Co., among which were the integrating light counter, the N.P.L. moisture meter, indicating instruments, and galvanometers.

*

A full size exhibit of storage walls and a display of scale models showing examples of storage bins formed with these wall units were featured by Stelcon (Industrial Floors). As in previous years, the floor of the company's stand was formed of anchor steel plates which are widely used in many types of factory because of their dustless, hygienic, and wear-resistant qualities.

Film Strips for the Printer

A series of coloured film strips as a means of bringing the printer up to date with developments in ink technology has been devised by Coates Brothers Inks. Consisting of photographs of ink making and ink testing equipment and of diagrams illustrating recent advances in printing ink manufacture, the film strips cover a wide field including Neonink daylight fluorescent inks, Coates bimetal plates, metal coatings, and the latest methods of ink drying.

These film strips are by way of being a supplement to the company's sound and colour film "Scientific Manufacture of Printing Ink."

Stainless Steel Plant

Stainless steel equipment for the food manufacturing trades, including meat preparation tables, food troughs, and mixing bowls, are supplied by J. and R. (Butchers) Supplies. Technical representatives are always available to advise on particular equipment problems.

Pest Control

A method of insect pest control that requires no labour or apparatus, little interference with working, and the minimum of precautions against tainting has been devised by Waeco.

In its most modern form, Fumite liberates both DDT and lindane, the pure, odourless gamma isomer of benzene hexachloride.

The Brush cob tractor.

Industrial Trucks and Tractors

The battery electric industrial trucks and tractors manufactured by Brush Coachwork, a subsidiary of the Brush Electrical Engineering Co., and distributed by Henlys, are becoming increasingly popular in industry for the quick turnround of loads up to two tons.

The low loader type has an 11 in. loading height elevating through 5 in. for stillage work. All platforms have a standard length of 5 ft. 6 in. by alternative widths of 2 ft. 2 in., 3 ft., 3 ft. 6 in., and 4 ft. 3 in.

High loading trucks with the same alternative platform areas but with 19 in. loading height are mounted on three 18 in. × 7 in. pneumatic tyres with specially corded walls.

Another type is the Cob tractor, capable of towing up to five ton loads.

All these industrial units have direct tiller steering giving a lock through 180° which gives them exceptional manoeuvrability.

Institute of Directors

The following directors of firms in the food industry have recently been elected Fellows of the Institute of Directors:

J. C. Burgess, F.C.A., R. A. Brand and Co.

R. H. Rose, British Soya Products.

E. H. Stevenson, B.Com., C.A., A.C.W.A., Cottage Rusks.

J. Cleland, Henry Denny and Sons.

The Hon. Gordon W. N. Palmer, M.B.E., Huntley and Palmers.

R. P. Clifton, A. Heilbut, O.B.E., R. A. Hodgson, and E. A. H. Peat, Lewis Peat, Ltd.

G. A. Snodgrass, T.D., B.Sc., Sawers, Ltd.

J. A. Christie, V.C., Smallmans, Ltd.

Sir Archibald Forbes, Spillers.

Jacketed Mixing Pan

A recent development in the wide range of stainless steel equipment manufactured for the food industry by The Taylor Rustless Fittings Co., is a jacketed mixing pan which should prove useful to manufacturers of jam and toffee and many other products. Fitted with self-contained mixing gear, these pans have a capacity of 25 gallons and a working steam pressure of 40 lb. per sq. in.

Employment of Fuel Technologists

Any firm using over 5,000 tons of coal a year should employ a fuel technologist, according to Dr. E. A. C. Chamberlain, Chief Scientist, Scotland, National Coal Board. At a recent Glasgow conference he said that there was ample evidence to show that such an appointment would repay itself within a year by economies of a major order. Where a firm was not large enough to employ a fuel technologist itself it would benefit by grouping with others in the area to employ such a specialist.

Citing the magnificent work done by the M.O.F. mobile testing vans in Scotland on such work, he said that 40 major surveys had now been completed. One example of successful adoption of their policies was the conversion of a group of six boilers to stoker firing at a cost of £6,000. It was expected that the money would be repaid in two or three years but actual experience had been a saving in one year of £10,000.

By proper use of existing plant it would be possible to achieve a minimum economy of 10 per cent. Assuming there were some 2,500 Lancashire boilers in Scotland, that gave a potential saving of 550,000 tons of fuel per annum.

Bakers' Prepared Materials

For a period of 30 years, the distribution and packing of egg products have been undertaken by Geo. W. Pickles and Co., but owing to difficulties in obtaining the required imports the company embarked 12 months ago upon the almond products trade. In June last year, modern plant was installed for the production of marzipans, macaroon paste, marshmallow, and other bakers' prepared materials.

Within a matter of months of introducing these products to the trade, they had established a firm connexion with bakeries producing high-class confectionery.

Food Machinery Position

Although the present position of plant and equipment was far from what manufacturers would wish, Mr. A. P. L. Blaxter, chairman of the Food Machinery Association, said at a recent luncheon that the general position was better than it was a year ago. Manufacturers who had done their best to keep up exports were hampered by the lack of steel and also by the ever-changing policies of the Government on the question of balance of payments. Mr. Blaxter said that he would like to do away with price controls, allocations, and so forth, as he felt sure that the immediate chaos which would arise would bring people to realise true values. Even if it did not work, it could not be much worse than the results of checking the inflationary spiral were proving to be.

In his response to the chairman, Sir Archibald Forbes, President of the Federation of British Industries, spoke of the extent to which the Government was looking to the engineering industry to increase exports to enable them to get over the present state of affairs. The fact that the downward trend had been halted in March was a notable achievement, but there was as yet no cause for rejoicing. Until a surplus could be built up, there would always be the danger of hardship and want. The immediate need for the export of capital goods had been made the greater because of the recession in the demand for consumer goods, and it may be that there would have to be some permanent change in the pattern of the export trade from this country.

The present situation was aggravated by a number of factors, and Sir Archibald said that the running down of physical assets was a bad thing, but the danger of running down the spirit of men was worse. He stressed strongly that initiative should be more strongly fostered in this country by the provision of suitable incentives and rewards. He concluded by saying that a more realistic approach should be made to the present problems of manufacturers.

Erections and Extensions

A new depot is to be erected on a site at Blyth, Northumberland, by Rington's Tea Company.

*

Plans have been prepared on behalf of Marsh and Baxter for the erection of factory buildings and installation of new plant at Brierley Hill, at an estimated cost of £250,000.

*

Expansion of their operations has made it necessary for the McGraw-Hill Publishing Co. to obtain larger premises, and the building situated at 95, Farringdon Street, E.C.4, has recently been acquired for this purpose.

New Protein Product

A spray-dried and practically soluble white powder, known as Neolac, containing about 80 per cent. lactose and 1 per cent. starch is being marketed by Soya and Protein Products. This product should prove of great interest to ice cream manufacturers who are short of milk powder or lactose.

It is of equal interest to the sausage manufacturers and the sugar confectionery and flour confectionery trades. It will replace milk powder physically in sausages by 6 per cent. by weight in the mixing and prove an excellent absorbing agent of any surplus fat.

The high solubility of Neolac makes it exceptionally useful as a filler in sugar confectionery and flour confectionery.

Where nutritional value is of particular importance, grade "S" containing about 24 per cent. lactose, 24 per cent. protein, 29 per cent. maltose, and 9 per cent. fat is available.

Container Recovery

The need for container recovery is as great now as it was during the war.

Up to the beginning of this year, although there were restrictions on the use of hard currency, a certain amount of packing material could still be imported from soft currency areas. Now, however, all overseas spending is restricted, and a 25 per cent. cut was imposed on January 1. This operates on a cost and not a tonnage basis so, as prices fluctuate, it is impossible to foresee how widespread the effect will be. The effects of the currency restrictions have not yet been felt and experts believe that by the second half of this year packing materials will be extremely scarce.

The situation is further complicated by the fact that some industries are experiencing a trade recession at the moment.

During the last year, Container Recovery Service has been making an all-out drive to conserve materials by increasing the number of containers recovered and returned to manufacturers for further use.

The efforts made by C.R.S. are showing good results.

In January the service returned 4,107,860 fiberites to the manufacturers who participate in the scheme. All were in sufficiently good condition to stand at least one more trip. This number is equivalent to approximately 4,107 tons of new fibreboard. The total number of containers recovered (including sacks, bags, and drums) was 4,352,671.

The aim of the service is to increase this figure still further and ensure that no container is discarded before it has done its maximum number of trips and that each one becomes unserviceable only through unavoidable wear and tear.

OBITER DICTA

• Long live the hygienic wrapped loaf and the people who wrap them. — *Correspondent to "Evening Times."*

• We in this country are very slack about the way we look after food; why we don't have epidemics, I can't think.—*Mr. W. Blake Odgers, Q.C.*

• We have already mortgaged the future of our grandchildren in terms of the Government debt they will have to pay; are we also going to doom them to a vegetarian diet?—*Mr. F. W. Specht, U.S.A.*

• If you are hungry, you will eat anything, clean or not. So instead of spending good money on food research departments, spend it on food and we'll eat it. — *One correspondent to "Tit-Bits."*

• Surely there is too much talk about hygiene. While I like cleanliness, I do think we can go too far with it. No matter how food is wrapped, or how scrupulously it is handled, it will eventually come into contact with those ever-present germs. — *Another correspondent to "Tit-Bits."*

• That there is a demand for meat as such is shown by the fact that the people in this country bought tinned ham last year at 10s. a lb. in such volume that we actually spent more money on tinned ham than on all the mutton and lamb we imported.—*Mr. R. J. Charlton, vice-president of the N.F.U.*

• I think you should get indignant about this method of substituting chemicals which are quite foreign to the human body, but are pushed into our foods for the sake of appearances, with no regard to the effect on our health. — *Dr. W. R. Middlebrook, to members of the British Housewives' League.*

• I hope the time is not far distant when we shall be rid of subsidies. Let us get down to realism and stop living in a fool's paradise. There must be some controls, but leave the food trade free from politics, and it will not be long before things find their level. — *Mr. G. H. Capel, President of the Newport Chamber of Trade.*

BOOKLETS RECEIVED

A pamphlet giving revised prices for fluorescent fittings and lamps has been published by G.E.C.

*

The many applications of visible flow pipelines are described in a new booklet published by James A. Jobling and Co.

*

Full details of the swing hammer granulator manufactured by British Jeffrey-Diamond are contained in a recent publication issued by the company.

*

Examples of structural steel design to conform with the requirements of B.S. 449 : 1948 are contained in Part 3, technical brochure No. 4 issued by the British Constructional Steelwork Association.

*

The importance of refrigerated display is stressed in a bulletin which has recently been published by York Shipley. It also illustrates the wide range of cabinets, cold rooms, and counters that are available for this purpose.

*

The new CO_2 recorder for fruit stores which enables the gas conditions in as many as six separate fruit storage rooms to be recorded on a single point recorder is described in a pamphlet issued by the Cambridge Instrument Co.

*

Written specially for dietitians, caterers, and canteen feeding centres, a new booklet "Rational Catering," published by British Soya Products, describes the use of soya as a foodstuff and incorporates many useful recipes for such things as soups, sauces, meat dishes, fish cakes, puddings, and cakes.

World Food News

FORTHCOMING EVENTS

International Instrument Congress

The First International Instrument Congress and Exposition, to be held in Philadelphia from September 14 to 24, 1954, will celebrate the tenth anniversary of the Instrument Society of America. It is expected that this meeting will attract a world wide audience from manufacturing companies, research laboratories, educational institutions, and Government bureaux.

Physics Symposium

A symposium on new research techniques in physics will be held in Rio de Janeiro, São José dos Campos, and São Paulo, from July 15 to July 29 under the joint sponsorship of the Brazilian Academy of Sciences, the National Research Council of Brazil, and the Unesco Science Co-operation Centre for Latin America. Physicists from countries outside Latin America are invited to attend this symposium. Further information can be obtained from Prof. J. Leite Lopes, Centro Brasileiro de Pesquisas Fisicas, Avenida Pasteur 250, Rio de Janeiro.

Machinery Exhibition at Rotterdam

A large exhibition of machinery for the chemical and food processing industries, known as the Vochema Fair, is to be organised by the Utrecht Fair management, in association with the manufacturers and dealers concerned. It will take place in Rotterdam from October 21 to October 29, 1952. The food machinery section will not include the products of the dairy, butchers' and bakers' machinery industries.

The exhibition will be international as far as the products are concerned though stands will, as usual, be booked by the importers or agents in Holland. Enquiries should be addressed to the United Kingdom agent, W. Friedhoff, 10 Gloucester Place, London, W.1.

U.S.A. Food Distributors' Exhibition

The 25th Annual Exhibition of the National Food Distributors' Association is to be held this year at Chicago from August 11 to August 14, 1952.

This show is organised mainly for the benefit of service wholesalers, that is, those firms usually specialising in the sale of one or two products rather than a full product line of such items as margarine, biscuits, frozen fish, etc. Most of the space is taken by manufacturers and others who can use the service wholesalers as suitable channels for distribution.

No details concerning the size of booths, costs of floor space, etc., are yet available, but it is considered that this Show will appeal only to those United Kingdom firms with mass distribution prospects in the U.S.A. who wish to show through their distributors.

West German Food Exports

Exports of foodstuffs from Western Germany increased to a value of 489 million marks in 1951, from 196 million in 1950. The 150 per cent. increase in value resulted partly from higher prices, but calculated at 1950 prices, the increase was still 126 per cent.

Among the various items, exports of meat and meat products showed the sharpest rise, increasing from 7,100,000 marks in 1950 to almost 134 million marks in 1951. The bulk of these exports went to Britain.

New Head for M.I.T.

Dr. Bernard E. Proctor has been appointed Head of the Department of Food Technology at the Massachusetts Institute of Technology. Dr. Proctor, who is Professor of Food Technology and Director of the Samuel Cate Prescott Laboratories of Food Technology at M.I.T., has been acting head of the department since January, 1951.

He has conducted valuable research in food preservation, fermentation, microbiology, electronic sterilisation, and sanitation, and is President-elect of the Institute of Food Technologists and special consultant to the U.S. Public Health Service.

Mediterranean Fisheries Council

Agreement has been reached for the establishment of a General Fisheries Council for the Mediterranean.

The agreement came into force when the necessary fifth notification of acceptance—from Israel—was received at FAO's Rome headquarters. Governments previously accepting the agreement were Italy, United Kingdom, Egypt, and Yugoslavia.

The Council, a technical and administrative body formed from among member Governments of FAO, will encourage and co-ordinate national efforts for making more and better use of the fisheries in the sea and in the fresh waters of the Mediterranean area. The Council will cite problems and rate them according to importance, exchange information on matters of common interest, and act as an advisory and consultative body to FAO in such fields as extension work and vocational training centres.

U.K. Food Fair

The Dutch Central Institute for the Promotion of Foreign Trade has announced that Holland is to be represented at the British Food Fair being held in London from July 5 to 19.

Quality Control by Instrument

An instrument has been developed by an American firm, Bausch and Lomb, known as a stereomicroscope. Used at the moment extensively for biological work and dissecting, this three-dimensional microscope is rapidly finding more and more application in industry, as it enables better and quicker examination of products.

Canned Salmon Purchases

It has been announced that Great Britain will buy no canned salmon from British Columbia this year. Australia, New Zealand, and South Africa discontinued salmon orders some time ago and other foreign buyers have decreased purchases.

Representatives of the canners are discussing the situation with U.S. authorities.

Whaling Results

The ten Norwegian pelagic whaling expeditions in the Antarctic produced altogether 1,103,536 barrels of oil during the 1951-52 season, including 136,535 barrels of sperm oil. The total production is equal to about 180,000 tons.

The one South African and three British expeditions had an output of 630,297 barrels of oil, including 85,441 barrels of sperm oil. The output of both the Norwegian and British expeditions is better than in the 1950-51 season.

The Norwegian whaling companies have sold 20,000 tons of whale oil to processing factories in Norway at a price of 2,000 kroner (£100) a ton. Last December the companies sold 15,000 tons to Denmark and Sweden at £120 a ton.

According to reports circulating in Tönsberg, the Norwegian whaling port, the British Ministry of Food, which last autumn paid £110 a ton for advance purchases of whale oil from British expeditions now operating in the Antarctic, is now not willing to pay even £100 a ton for whale oil. Sven Foyn Bruun, acting chairman of the Norwegian whaling companies' sales association, states that the unsold portion of Norwegian whale oil from the present season's output will be stored temporarily. Storage space has been secured in Norway and abroad.

OVERSEAS ENQUIRIES

Hard Candies and Chocolates

Mr. Robert Graham, 6723, 35th Avenue S.W., Seattle, Washington, has expressed interest in receiving quotations for confectionery, specifically hard candies in 2 or 3 oz. transparent bags for sale to the concessions trade and for chocolates with assorted centres, including hard ones, in ½ lb. and 1 lb. boxes.

These products are subject to the U.S. Food and Drug Administration regulations, details of which are available from the Commercial Relations and Exports Department of the Board of Trade.

Firms interested in this enquiry should forward c.i.f. quotations in dollars direct to Mr. Graham.

■

Salted Codfish and Herring

The Nordic Maid Company, 1634, 15th Avenue, West, Seattle 99, Washington, have expressed interest in obtaining supplies of salted codfish and herring from the United Kingdom.

Firms interested in this enquiry should forward quotations direct to the Nordic Maid Co., who have stated they will only be able to give attention to quotations c.i.f. Seattle in dollars.

Laboratory Equipment

An enquiry has been received from the Palestine Discount Bank, 27, Yehuda Halevi Street, Tel Aviv, on behalf of Dr. E. Elian, P.O.B. 511, Haifa. Dr. Elian is about to establish a laboratory, and would like to buy equipment for this purpose from United Kingdom firms.

Firms who are interested in this enquiry should send full particulars of their products direct to Dr. Elian.

■

Moulded Chocolate

The D. Kurman Company of 427, North Water Street, Milwaukee, Wisconsin, wish to receive quotations from British manufacturers of moulded chocolate products to be distributed in and around the city of Milwaukee. Their particular interest at the moment is for moulded chocolate lines suitable for the Christmas trade and subsequently for Easter 1953. Their initial orders would probably not be substantial but it is believed that business could be worked up to interesting proportions.

British firms who are interested are invited to get into touch with Mr. Jerome H. Berman of the D. Kurman Co., quoting prices in dollars, preferably c.i.f. Milwaukee or, at least, c.i.f. New York.

Food Products and Machinery

Confiteria Vertua S.A. of B. Constant 334, Asuncion, Paraguay, wish to import from the United Kingdom powdered, condensed, and evaporated milk; milk foods for babies; cheeses; powdered cocoa (sweetened and non-sweetened); teas and coffees; edible cereal flours; meat, fish, and vegetable preserves; chocolates, sweets, bonbons, chewing gums, and pastilles; all ingredients relating to the confectionery industry; all apparatus (including laboratory equipment) for confectionery manufacture; glucose products; and all canned and preserved foods.

United Kingdom manufacturers who are interested in this enquiry should write direct to Confiteria Vertua, S.A., giving particulars of their products.

Brazilian Sugar Mills

In view of the fact that Brazilian sugar consumption is increasing at a higher rate than local production, it has been decided to construct a series of new sugar mills. This was disclosed by the President of the Brazilian Sugar and Alcohol Institute, who has suggested the setting up of a board to examine the question and to determine the capacity and location of each new plant.

News from the Ministries

Milk Distributors' Margins

Because of increases of milk distributors' costs, the retail margin for milk sold in England and Wales has been increased by ½d. per gallon with effect from April 1, 1952.

The Milk (Control and Maximum Prices) (Great Britain) (Amendment) Order, 1952, has therefore been made which reduces the maximum wholesale prices of all types of milk, other than sterilised milk, by ½d. per gallon.

Although the Order did not become operative until May 1, 1952, the Ministry is reducing its first hand selling price by ½d. per gallon for the month of April, 1952. Dairymen buying from wholesalers or depots should, therefore, look to their suppliers to make corresponding adjustments in prices.

The price of milk to the consumer and the price paid to the producer are not affected by these changes.

Labelling of Christmas Puddings

From March 31, 1952, the ingredients of prepacked Christmas puddings must be specified on the labels, in accordance with the requirements of the Labelling of Food Order, 1950. Until now, Christmas puddings have been exempted from these requirements to allow time for the disposal of stocks manufactured before the Labelling of Food Order, 1950, came into force.

The Labelling of Food (Amendment) Order, 1952, has been made to give effect to this change.

Meat Exchange

As a result of an outbreak of foot and mouth disease in Saskatchewan, Canadian livestock and meat which would normally be sold in the U.S.A. are not permitted entry to that market. Canada has therefore a surplus of beef and pork.

Agreement has been reached between the Governments of the United Kingdom, New Zealand, and Canada whereby Canadian meat will be shipped to the U.K. in exchange for New Zealand beef or pork which will in turn be sold through normal commercial channels in the U.S.A. The Canadian meat to be shipped to Britain will not come from or through the affected area in Canada.

The United Kingdom will pay New Zealand in sterling at the existing New Zealand-United Kingdom contract rates and Canada will receive the proceeds from the sale of the New Zealand produce in the U.S.A. As the New Zealand meat has to be exported frozen it will realise less in the U.S.A. than would have been received for the fresh Canadian product. Although there will be a net loss to Canada, Canada has expressed a willingness to recompense New Zealand for the trouble involved in implementing the exchange. Consideration is therefore being given to the determination of a share for New Zealand in any surplus should the net proceeds in the U.S.A. exceed the sterling cost of the meat.

Prices of Ships' Stores

After consultation with shipowners, ships' stores dealers, shipping butchers, and wholesalers, the Government has decided that as from April 15, 1952, bacon, butter, canned corned meat, carcass meat, cheese, eggs, and flour will no longer be sold at subsidised prices as ships' stores to foreign-going ships.

The new arrangements will not apply to foods when supplied to any ship for use in port or harbour, or to fishing vessels, to ships going to the Channel Islands, the Isle of Man, the Irish Republic, or the Continent of Europe between Brest and the River Elbe, or to ships engaged in the coasting trade. Sales to such ships will continue to be made at subsidised prices.

Preserved Unsweetened Fruit

An application is being considered by the Board of Trade for the reduction of the protective duty on the class of preserved but unsweetened fruit shown in the current Customs and Excise Tariff of the United Kingdom.

The more important fruits which are chargeable with duty under this residual heading are apricots, peaches, pears, and pineapples, preserved without added sugar.

White Fish Authority Order

The White Fish Authority (Registration of Wholesale Merchants) Regulations, 1952, made by the White Fish Authority, have been confirmed by the Minister of Agriculture and Fisheries, the Secretary of State for Scotland, the Minister of Food, and the Secretary of State for the Home Department by the White Fish Authority (Registration of Wholesale Merchants) Regulations Confirmatory Order, 1952.

The regulations, which apply to the United Kingdom, require wholesale merchants (defined as persons engaging in the white fish industry by carrying on the business of a wholesale merchant, other than a wholesale merchant who sells only at first hand) to register with the White Fish Authority within two months of April 21, 1952, registration fee, 5s.

Sugar for Rearing Queen Bees

Beekeepers may obtain up to 5 lb. of sugar for each mating nucleus for rearing queen bees. Application for permits must be made on the official form obtainable from local Food Offices.

After the applicant has completed the form, it should be countersigned by a responsible person, if possible by the Secretary of a County or District Beekeepers' Association or some other person with a knowledge of the technique of beekeeping, and returned by the applicant to his local Food Office. The last date for receipt of application is July 12, 1952.

The allowance will be granted only for nuclei from each of which a number of queens will be mated during the season to enable beekeepers to re-queen their own existing colonies or to supply queens to other beekeepers for re-queening existing colonies. No allowance will be made for feeding swarms or nuclei made solely for the purpose of increasing the number of colonies in the apiary, or for nuclei from which it is intended to mate only one queen.

Beekeepers who require only a small number of queens for re-queening should arrange, where practicable, to obtain queens from other beekeepers who are rearing large numbers.

Prices of Cereal Fillers

The maximum prices of cereal fillers have been increased by £13 2s. 6d. per ton as a result of the increase in the price of flour. The necessary amendment is being made to the Cereal Fillers Order, 1951.

Director of Milk Products Division

The New Zealand Dairy Products Marketing Commission have asked for the release of Mr. J. W. Rodden, C.B.E., who has been Director of the Milk Products Division of the Ministry of Food since 1944 and who was seconded to the Ministry by the Government of New Zealand in 1939.

Mr. H. E. Davis, who was Director of the Butter and Cheese Division and later of the Milk Products Division of the Ministry from 1939 to 1944, and who has recently retired from the services of the New Zealand Dairy Products Marketing Commission, has been appointed to succeed Mr. Rodden.

Amendment of Feedingstuffs Order

The Feedingstuffs (Prices) (Amendment) Order, 1952, has been made by the Minister of Food and came into force on April 15, 1952, and the Feedingstuffs (Prices) Order, 1951, is further amended.

The manufacturing margins and some processing margins of compounders have been increased. Provender millers' margins on processed maize, barley, oats, sorghums, wheat, rye, and dredge corn have also been increased, the increases being taken into account in calculating the prices of these grains when processed.

A maximum processing charge is prescribed for grain sorghums when used as an ingredient in compounds, and a charge is now permitted for clipping oats sold to owners of blood-stock and racehorses.

Bread Subsidy

The rate of subsidy payable in England and Wales, based on costings in September, 1951, is 9s. 3½d. per sack. This rate applies from September 23, 1951, in accordance with the recent decision to adjust the rate of subsidy from the end of the costed period on which the adjustment is based, and at the same time to discontinue the allowance for "trends." It will thus supersede the rate of subsidy previously determined for the six months from September 23, 1951, namely 7s. 3½d., less a deduction of 1d. per sack for "trends" which will now be refunded. The new rate of 9s. 3½d. accordingly represents a net increase of 2s. per sack.

From March 16, 1952, the rate of subsidy is raised to 10s. 2½d. per sack to take account of increases in the price of petrol (at the rate of 4d. per sack) and in wholesale discounts (at the rate of 7d. per sack).

From May 11, 1952, as already announced, there will be a further increase of 2s. 2d. per sack to take account of the changes in the prices of flour and bread on March 16, 1952. This will bring the rate of subsidy up to 12s. 4½d. per sack.

Provision has been made on Subsidy Claim Form B.S. 82 for a payment on account of 1s. 6d. per sack in respect of the above increases during the period September 23, 1951, to April 19, 1952.

Import Licensing Regulations

A new consolidated list, bringing together in convenient form the various regulations now in force, has been issued by the Board of Trade. Appendix I, for example, is a list of goods which can be imported from any country without licence, Appendix II lists goods which can be freely imported from the "liberalisation" list of countries, and Appendix IV goods which can be freely imported from the sterling area.

Pig Meat from S. Africa

Last autumn the importation of pig meat and pig products into Great Britain from the Union of South Africa was prohibited owing to an outbreak of African Swine Fever in the Union. Reports received from the South African authorities show that no outbreaks of the disease have occurred this year and it has therefore been decided to withdraw the importation restrictions as from May 1, 1952.

Economies in the Food Ministry

As announced by the Minister of Food in the House of Commons, the arrangements to reduce the staff of the Ministry will involve terminating certain activities, including food advice work. The Food Advice Division was, therefore, dissolved on April 30, 1952. It will now be necessary to discontinue the demonstrations and other services hitherto provided by that Division for the public, for educational and health authorities, for women's organisations, and for various other bodies.

*

It will also be necessary to terminate the service hitherto provided of advising manufacturers and other food traders individually about labels submitted for scrutiny in connexion with Regulation I of the Defence (Sale of Food) Regulations and the labelling requirements of the Labelling of Food Order. This advisory service was established when the Defence (Sale of Food) Regulations were introduced in 1943.

Information and Advice

This Service is available for subscribers to FOOD MANUFACTURE. Postal replies will be sent if a stamped, addressed envelope is enclosed with enquiries.

Jam Filling for the Small Manufacturer

B.5724. *Could you please give us some information on filling jam by hand.* (London.)

The methods of effecting the filling of jam by hand have to be adjusted according to the individual system of production and the layout of the factory. If sufficient floor space is available, circular adjustable turn-tables can be used. The jam is brought to the tables in bogies and emptied into receiving tanks placed beside the tables. After filling a jar, the operator revolves the rotary table while another operator takes the filled jars off, replacing them by empty ones.

Another method is to pack the empty jars into trays, each one holding a certain number of containers. These trays are then pushed along the roller conveyor to the filling operators. The containers are filled without being removed from the tray, wiped clear of spillage, tissued, and placed on a truck specially designed to hold a certain number of batches, thus facilitating checking. To prevent spilling, it is advisable to run the trays along the roller conveyor on slides fitted with steel bands. The trucks are moved to the cooling room after the preliminary setting has taken place.

Larger containers, such as 28 lb. tins, are preferably filled in two or three operations. This precaution will prevent the formation of an over-heated centre, which is a frequent cause of discoloration owing to burning.

Roll-mops

B.5721. *Could you please give us some information regarding the preparation of roll-mops.* (Norfolk.)

The following directions are recommended for the preparation of roll-mops from well-cured salt herring of medium size and good quality:

Salt herring	10	lb.
Distilled vinegar (5 per cent. acidity)	2	qt.
Dill pickles (medium size)	8	
Chopped onions	4	oz.
Sugar	2½	,,
Whole cloves	¼	,,
Mustard seed	¼	,,
Chili peppers	¼	,,
Bay leaves	⅛	,,
Whole black pepper	⅛	,,
Whole white pepper	⅛	,,
Whole allspice	⅛	,,
Powdered nutmeg	1/16	,,
Cracked cinnamon	1/16	,,
Cracked ginger	1/16	,,
Crushed cardamon	1/16	,,

The bay leaves and chili peppers are put in a small cloth bag, so that they can be easily separated for later use, and placed, together with the balance of the spices and three-quarters of a quart of vinegar, into a covered receptacle. This is brought to the boil and allowed to simmer for one and a half to two hours. Violent boiling causes loss of the volatile acetic acid. A very simple way is to put the spices in a common fruit jar and place in boiling water for two hours. This is allowed to stand for one to two weeks after boiling to ensure still greater extraction of the spicing materials. The chili peppers and bay leaves, which are to be used for decorative purposes, are removed and the pickle is strained through a cloth bag to remove the spices. These should be well mixed ready for adding to the jars before packing. Slightly less than three-quarters of a quart of pickle will be obtained, which should be sufficient for about 20 jars of the size used in these experiments.

To prepare the fish, the heads are first removed and then scaled and washed. The fish is then split into two fillets and trimmed, freshened for two and a half hours in running water, and then drained. Ten lb. of medium sized herring should give about 6 lb. drained weight.

The fillets are packed skin down in a stone crock (a two gallon size answers the purpose nicely), and then covered with one and a quarter quarts of vinegar. If necessary, a light weight can be placed on top to keep the fillets well covered. Curing in a cool place should take 40 to 48 hours. The fish are then removed and drained. The vinegar should now test about 2 per cent. acid and show a salinometer reading of about 30°. The fish has absorbed much of the acid and has lost some salt.

Each dill pickle is cut lengthwise into four parts, then across the centre, making eight pieces in all. The fillets are rolled around a piece of pickle and fastened with a fresh clove. A clove serves the purpose just as well as a toothpick and adds to the attractiveness of the pack. One teaspoonful of mixed used spices is placed on the bottom of the jar, and the fish is then packed. With medium sized herring three rolls will pack nicely into a jar (with a capacity of six fluid ounces) if placed on end. The sides are decorated with a couple of chili peppers and a bay leaf, and sufficient pickle is added to fill, from 25 to 35 ml. (this is about equivalent to two level tablespoonsful). The net weight should be five and a half ounces or over. The jars should be sealed immediately after packing. Vacuum sealing is preferable.

Cold storage at about 35° is advisable to ensure longest preservation.

Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.5700. *Emulsifying agents.* (Lancs.)
B.5701. *Synthetic cream.* (South Africa.)
B.5702. *By-products for animal feeding.* (Notts.)
B.5704. *Wafer biscuit cups.* (Mon.)
B.5705. *Paper bags.* (Warwicks.)
B.5707. *Vinegar plant.* (Pakistan.)
B.5708. *Bacon smoking plant.* (London.)
B.5709. *Piping jelly.* (London.)
B.5711. *Metal trays.* (Perth.)
B.5713. *Tin opener.* (Warwicks.)
B.5714. *Rice and tapioca flakes.* (Staffs.)
B.5715. *Crystallised carotene.* (Germany.)
B.5717. *Peanut butter.* (Australia.)
B.5718. *Cabinets for frozen foods.* (Surrey.)
B.5719. *Emulsifiers.* (London.)
B.5720. *Ice cream cones.* (Palestine.)
B.5722. *Fruit juices.* (Middlesex.)
B.5723. *Jelly crystals.* (Ireland.)
B.5734. *Gas burners.* (Lancs.)
B.5735. *Wafer filling.* (London.)
B.5736. *Chicken canning.* (Ireland.)
B.5737. *Flavours.* (Lancs.)
B.5738. *Cheese spread.* (Yorks.)

Recent Patents

671,439. PAGE, A. C.: Method of and apparatus for producing composite biscuits.
671,450. WEBB CO., J B.: Trolley propelling device for conveyor.
671,488. SIMON (HOLDINGS), LTD., H.: Feeding devices for roller mills for cereal products.
671,565. MILES LABORATORIES, INC.: Packaging materials in tablet form and the package produced thereby.
671,714. MERCIER, D. C. C.: Automatic sampling of granular or powdered materials.
671,719. FRANCHI, F. A. R.: Method of manufacture of a container for food and other produce and a container produced by the said method.
671,723. RINGERS' CACAO-EN CHOCOLADE-FABRIEKEN N.V.: Packing material for flat or thin chocolates and the like.
671,725. BRITISH THOMSON-HOUSTON CO., LTD.: Electrical heating devices.
671,745. HENKEL, A. A.: Means for drawing out kneadable material such as a mass of sugar, into the form of a cord.
671,749. ANDERSSON, N.: Paper bag manufacturing machines.

Abstract of a Recent Specification

Caramel-flavoured Starch Powder

This invention relates, generally, to the provision of a non-hygroscopic, free-flowing, caramel-flavoured starch powder and to a method of making the same.

The process consists of caramelising sugar to the desired degree, cooling the resulting caramel below caramelisation temperature by addition of water thereto, mixing the resulting caramel syrup solution with starch, drying the caramel-starch mixture, and comminuting the resulting dried mixture to a powder.

The principal base or ingredient of the caramel-flavoured pudding mixes has been a mixture of pulverised caramel and starch. Such a mixture tends to vary considerably in flavour and, because of its hygroscopicity, tends to cake to an undesirable degree.

As currently manufactured, sugar is caramelised to the desired degree and then the caramel is cooled and solidified by pouring on to a slab or chilling on cold rolls, after which it is ground and mixed with starch so as to diminish the hygroscopic characteristics. Preferably, the solidified caramel is ground in the presence of starch. However, the small caramel particles in the starch remain noticeably hygroscopic, and the presence of the starch alone does not eliminate or sufficiently reduce their hygroscopicity.

In order to decrease the hygroscopic effect, the practice has been to carry out the grinding and mixing operations, as far as possible, in a cool, dry atmosphere. However, even when so prepared under the most favourable conditions, the resulting caramel-starch product is undesirably hygroscopic for use in packaged pudding mixes.

Furthermore, the present method of preparing the caramel-starch powder or mix is characterised by an objectionable lack of uniformity in the caramel flavour, and not infrequently it has a bitter or burned taste. This defect in flavour appears to be inherent in the method of preparing and handling the caramel. Thus, after the sugar has been caramelised to the point where it has the proper flavour, a substantial portion of the caramel continues to remain at the caramelisation temperature before it becomes chilled. Obviously, the caramel becomes increasingly over-caramelised, even to the point of burning, as it is poured out on to the chilling rolls.

It has been found that by proper addition of water to the caramel a caramel-flavoured starch powder can be prepared which is both free-flowing under ordinary atmospheric conditions and is characterised by a very uniform flavour, entirely free from any bitterness or burned taste.

655,227. *Corn Products Refining Company.*

Trade Marks

AZURE. 702,433. Olive oil (for food); and meats, fruits, and vegetables, all being canned foods. **Compagnie Générale d'Importation, Société Anonyme** (a Société Anonyme organised under the laws of France), 5, Rue St. Jacques, Marseilles, France, and 52, Gresham Street, London, E.C.2; Merchants.

BENETSOL.—702,457. Degreasing preparations and detergents, all for use in industrial processes or in the course of manufacture. **Bennett (Hyde), Limited,** Boston Mills, off Randell Street, Hyde, Chester.

SAV.—703,510. Apple vinegar. **Showerings, Limited,** Kilver Street Brewery, Kilver Street, Shepton Mallet, Somerset; Merchants.

DAROLS.—703,558. Non-medicated confectionery. **W. and M. Duncan, Limited,** 27, Beaverhall Road, Edinburgh; Manufacturers.

FRIARY GLEN.—703,695. Tinned meat; preserved, dried, and cooked vegetables; tinned meat and vegetables, and sausages, soups, and preparations for making soups. **Clonmel Foods, Limited** (a Company incorporated under the laws of the Republic of Ireland), Clonmel, County Tipperary, Republic of Ireland; Manufacturers.

GAIETY.—703,765. Jams and marmalade. **A. J. Mills and Company, Limited,** Colonial House, Tooley Street, London, S.E.1; Merchants.

OCEAN BELLE.—703,846. Canned fish, but not including canned salmon. **United Fish Canners, Limited** (a Joint Stock Company organised under the laws of the Union of South Africa), Montague Road, Tiger Oats Estate, Maitland, Cape, Union of South Africa; Manufacturers.

GLOBE GRAVITY FEED.—703,909. Machines for slicing meat, fish, cheese, fruits, vegetables, and bread, and parts of such machines. **Globe Slicing Machine Company, Inc.** (a Corporation organised under the laws of the State of New York, United States of America), 224, Selleck Street, City of Stamford, County of Fairfield, State of Connecticut, United States of America; Manufacturers.

MARTAY.—703,930. Preserved, dried and cooked meats, fish, fruit, and vegetables. **Howard M. Taylor and Company, Limited,** 11 to 15, Monument Street, London, E.C.3; Merchants.

RELEASOMATIC.—704,382. Weighing balances. **L. Oertling, Limited,** 110, Gloucester Place, Portman Square, London, W.1; Manufacturers.

Recent patents and trade marks have been selected from the "Official Journal of Patents" and the "Official Trade Marks Journal" and are published by permission of the Controller of H.M.S.O.

New Companies

Alfred Michaels, Limited. (504735.) Caroline Place, Weymouth, Dorset. To carry on business of manufacturing, wholesale, and retail confectioners, etc. Nom. cap.: £2,000 in £1 shares. Permt. dirs.: R. Barzilay, 75, Buxton Road, Weymouth; A. Michaels, 27, Uppleby Road, Parkstone; R. Barzilay, address not stated.

Hartley Davies and Co., Limited. (504846.) Aldwych House, Aldwych, London, W.C.2. To carry on business of canned goods and produce merchants, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: H. R. Davies and Betty P. Davies, 30, Ashley Lane, London, N.W.4.

H. Tiffin and Son (Bournemouth), Limited. (504850.) 37, St. George Street, London, W.1. To carry on business of manufacturers of and dealers in insecticides, cleansing fluids, etc. Nom. cap.: £3,000 in £1 shares. Dirs.: F. V. Tiffin, 40, Sudbury Court Drive, Harrow, Middlesex; W. G. Barton, 12, Stourcliffe Avenue, Southbourne, Bournemouth.

Kent Krakles, Limited. (505099.) Hostye Farm, Cudham Lane, Cudham, Kent. To carry on business of packers and manufacturers of and dealers in preserved and concentrated foods, etc. Nom. cap.: £100 in £1 shares. Permt. dirs.: Mrs. J. E. Ilsley, Hostye Farm, Cudham Lane, Cudham; Mrs. K. M. E. Bazaz, Hostye Farm Cottage, Cudham Lane, Cudham.

S. Flatto, Limited. (505171.) 39, New Broad Street, London, E.C.2. To take over the business of sugar milling carried on at 97-99, Tooley Street, S.E.1, by the personal representatives of the late S. Flatto. Nom. cap.: £5,000 in £1 shares. Permt. dirs.: M. Flatto, 18, Forres Gardens, N.W.11; J. Flatto, 45, Brighton Road, Purley, Surrey.

Terrani Montesissa Agencies, Limited. (505175.) 60-66, Wardour Street, London, W.1. To carry on business of agents for the import and export of foodstuffs of all kinds, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: Olga Biro, 2, Oakwood Avenue, Beckenham, Kent; Ilya Suster, 123, Chatsworth Court, Pembroke Road, London, W.8.

Anderson and Dicker, Limited. (505206.) Kingsmead, Felpham, Bognor Regis. To carry on business of manufacturers of and dealers in ice cream, etc. Nom. cap.: £100 in £1 shares. Dirs.: J. S. Anderson, Foxglove Cottage, Flansham Lane, Bognor Regis; S. J. Dicker, 16, Kenilworth Road, Bognor Regis; J. Vincent and Mrs. E. Vincent, 19a, London Road, Bognor Regis.

Walter Johns and Company, Limited. (505690.) 22, Stuart Crescent, Wood Green, London, N.22. To carry on business of exporters, importers, buyers, sellers and manufacturers of merchandise, foodstuffs, provisions and produce, etc. Nom. cap.: £15,000 in £1 shares. Dirs.: J. A. Barr, 4, West Lodge Court, London, W.3; J. C. Newbery, 95, Sheringham Avenue, Southgate, London, N.14; E. S. W. Snuggs, St. Pauls Lodge, Kings Avenue, Winchmore Hill, London, N.21.

Correction.—The capital of Olivier Kerbiriou (Amalgamations), Limited, is £61,000 and not £100 as given on p. 210 of the May, 1952, issue of FOOD MANUFACTURE.

From Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.